

The Perceptions of Game Developers Compared to Research on Employment Readiness
Regarding Shortcomings in Expertise and Implications for Curriculum Development

by

Donald Ray Ramos

B.A. Southern California University, 1978

A.A. Golden West College, 1979

B.B.A. Simon Fraser University, 1998

M.A. Simon Fraser University, 2001

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE STUDIES

(Curriculum Studies)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

December 2011

© Donald Ray Ramos, 2011

Abstract

Twenty three interviews and four surveys were conducted as case studies investigating the perceptions of expertise, expertise acquisition, and gaps in employment readiness for novice game developers. Participants were primarily game development production staff and educators involved in game related programs. Research results were compared to employability skills research. The findings indicated that there is a great deal of alignment between them, but employability skills may be insufficient on their own to be a reliable standalone source for curriculum development in the game development field because of the industry's unique characteristics. Implications from the research results, and insights from the in-depth interviews, that may be relevant to curriculum developers include evidence for a mismatch of the values, needs, and expectations of stakeholders; and a delineation of key characteristics of expertise and long-term success that may be valuable for inclusion in curriculum outcomes and measures. Two of the key characteristics identified were goal-focused passion, and holistic perspectives. Holistic perspectives included an awareness of heuristic use of tacit knowledge. The model of an expert learner was supported as a potential curriculum outcome focus that encapsulated the main characteristics of expertise that novices or advanced beginners could acquire. Another implication is that there may be a relation between expert characteristics and characteristics of functional behaviours that are related to *positive psychology* and *cognitive behavioural therapy*.

Preface

The research for this dissertation received the approval of the UBC Behavioural Research Ethics Board. The Human Ethics Approved Certificate Number is H09-00467-001.

Table of Contents

Abstract	ii
Preface	iii
Table of Contents	iv
List of Tables	vii
List of Figures	ix
Glossary	x
Acknowledgements	xiv
Chapter 1 – The Gap Issue	1
Employability Skills Gaps From Employers’ Perspectives.....	3
Employability Skills Gaps From Educational Perspectives	10
Curriculum Development for Game Related Programs in Higher Education	14
Observations on the Nature of Employability Skills Gaps.....	17
Critical thinking as a case study of gap issues.....	18
Systemic issues	21
Other systemic educational issues	25
Chapter 2 - Literature Review	29
Expertise	30
Algo-heuristic, cognitive flexibility, and cognitive apprenticeship theory	35
Concepts from Enactivism and Complexity Theory	37
Towards Holism	39
Holism and the integration of development and learning.....	39
Transformative Learning in Relation to Holistic Education.....	41
Chapter 3 - Methodology	44
Research Purpose.....	44
Pragmatism as an Analytic Lens.....	44

Methodology: Multiple Case Studies	53
Sample Selection and Demographics	55
Interview and Coding Process	60
Data collection and coding	62
Analysis	65
Generalizability and Validity.....	67
Non-statistical qualitative quantities.....	68
Chapter 4 – Results.....	71
Interview Question #1: Perceived Negative Characteristics	71
Categorization decisions: Entitlement as an example of categorization problems	73
Category: Holistic Meta-Perspective Gaps.....	77
Categorization decisions: Outlying data.....	78
Category: Poor Communications.....	80
Category: Poor Work Habits	89
Interview Question #2: Perceived Causes of Negative Characteristics.....	89
The systemic category	95
The Lack of Experience category	96
The Personal Traits category	105
Systemic educational issues: Hidden curriculum sabotages collaborative mindset.....	112
Interview Question #3: Perception of Ideal Behaviours.....	121
Perception of ideal employee characteristics.....	125
Interview Question #4: Perception of Expert Characteristics.....	134
Positive characteristics extrapolated from negative characteristics.....	147
Successful games-industry veteran expert described	150
Research Question: Do Production Team Perceptions Align With Employability Skills Research?.....	156

Chapter 5 – Unexpected Results.....	165
“...not a typical novice”: Description of an Exceptional Novice.....	167
Expert Learners Compared to Exceptional Novices.....	191
Chapter 6 – Implications for Further Research	199
Alternative Educational Content and Outcomes: Expert Learner	201
Alternative Educational Methodology: Epistemic Game Simulation	207
Chapter 7 – Conclusion	212
References.....	217
Appendix 1: Conference Board of Canada Innovation Skills Profile.....	242
Appendix 2: Situation Summary List	244
Appendix 3: List of Primary References Used in Defining Categories.....	250
Novice Negative Characteristics.....	250
Ideal Characteristics.....	253
Expert Characteristics.....	258
Appendix 4: Conference Board of Canada’s Employability Skills Profile 2000+ Weighted for Relevance to Research Categories.....	263
Appendix 5: Interview Guide	266
Appendix 6: Interviewee Pseudonyms and Background Information (Complete).....	274

List of Tables

Table 1: Top Employability Skills.....	4
Table 2: Employment Skills - Comparison of Three Reports 1997 - 2004.....	5
Table 3: 10 Career-Killers to Avoid (Hoffman, 2007).....	7
Table 4: Western Educational Purposes Based on Egan	13
Table 5: Aims of Skill Acquisition and Expertise (Dreyfus & Dreyfus, 1986, pp. 16-51)	31
Table 6: Characteristics of Skill Acquisition and Expertise (Dreyfus & Dreyfus, 1986, 1989, 2004).....	32
Table 7: Areas of Focus in Developmental Theories	42
Table 8: Morgan's (2007) Pragmatic Alternative to the Key Issues in Social Science.....	45
Table 9: Demographics: Age, Gender, Country	57
Table 10: Demographics: Expertise.....	57
Table 11: Demographics: Education	57
Table 12: Demographics: Company	58
Table 13a and 13b: Interviewee Pseudonyms and Background Information.....	59
Table 14: Common Negative Novice Characteristics	72
Table 15: Perceived Causes of Negative Characteristics	90
Table 16: Causal Categories Linked to Negative Characteristics	91
Table 17: Comparative Counts for the Causes of Negative Characteristics.....	94
Table 18: Student Illusions About Being a Game Designer (Pulsipher, 2009).....	101
Table 19: Institution & Program Clarity & Confidence Ratings.....	119
Table 20: Situations In Which Negative Characteristics Commonly Present	121
Table 21: Negative Characteristic-Cause-Situation-Ideal Behaviour.....	123
Table 22: Ideal Characteristics	128

Table 23: Ideal Characteristics. # of References & # of Cases With >0 References	129
Table 24: Negative Characteristics: Disrupt Relations and Productivity (Condensed From Table 14).....	129
Table 25: Key Values of Stakeholders	133
Table 26: Stakeholder Values and Related Ideal and Negative Characteristics.....	133
Table 27: Perception of Expert Characteristics	134
Table 28: Expert Characteristics Percentages.....	138
Table 29: Positive Characteristics Extrapolated from Negative Characteristics	148
Table 30: Negative Inverse, Ideal, and Expert Characteristics Mapped.....	149
Table 31: Conference Board Employability Skills Profile 2000+ Weighted by Relevance to Research Categories.....	157
Table 32: Conference Board Employability Skills 2000+ (ES)	158
Table 33: ES and Challenges to Youth Coded to Negative Characteristics	160
Table 34: Exceptional “not a typical” Novice Mapped to Expert Characteristics	168
Table 35: 5 Stage Conscious Competence Model with Added Levels of Holistic Perspective .	186
Table 36: Characteristics of Expert Learners	198

List of Figures

Figure 1: Dewey's (1963) Models of Reflective Thinking, Active Experimentation Through Intelligent Action, and Experience as Interaction Within an Environment & Situation	52
Figure 2: The Contextual Environment of the Research Case Focus.....	53
Figure 3: Major Components of Expert Learning (Ertmer & Newby, 1996).....	194

Glossary

This glossary is intended to help the reader understand the intended meaning of words used in the dissertation only; not a dictionary meaning of the words. Terms that are intended to imply a specific external context are referenced as such.

Assertiveness, Assertiveness Training

A behavioural approach to standing up for one's self in socially acceptable and effective ways. It is used without explanation (implying a common understanding) in employability skills and competency profiles (Rychen & Salganik, 2001), as well as in psychology research as a characteristic or personality trait on its own, or as a descriptor or subcategory of a particular characteristic, for instance, of extraversion (John, Robins, & Pervin, 2008). There is not a single agreed upon definition, but in North America the behaviour is generally distinguished from aggressive behaviour that tends to dominate the needs of others, and passive behaviour that tends to subordinate personal needs. It can thus be seen as being based on a perspective that all needs are of equal value and the principle of win/win. *Assertiveness Training* teaches the application of appropriate assertive behavioural skills, perspectives that support it (including confidence and self-esteem), and knowledge and awareness (such as legal rights and awareness of self and others' perspectives and needs). Assertiveness is sometimes associated with forcefulness and aggressiveness (Chambers & Windschitl, 2004).

Community of Practice

People involved in a common association (arbitrary or otherwise), interest, or activity that has some shared systemic and/or structural dimension, for instance, a shared body of knowledge, common rituals, goals and rules, etc. As defined by Lave and Wenger (1991) the term also includes learning through the group's interactions, whether formal or informal, explicit or not.

Community of Enquiry

A pragmatic term for a group that agree on a common goal and on the pragmatic process (experimental, incremental, cumulative action) applied to reaching that goal.

Connoisseur

A person whose perspective and subtle awareness on a subject is perceived as grounded in comprehensive knowledge, and/or extensive experience, at such a high level that their judgments are considered valid even though the person is not a member of the community of practice. See Collins and Evans' (2007) discussion on Technical Connoisseurship.

Crunch-time, Crunch

The period of time leading up to an unalterable completion due date in which expectations exceed resources and are solved through increasingly harsh, intense, extended overtime hours. Additional resources are usually not an option because there is not sufficient time or people to train additional people.

Curriculum Exposure Paradigm, Liberal Arts Curriculum-Course Paradigm, Instructional Curriculum Paradigm

A *Curriculum Exposure Paradigm* includes an *Instruction Paradigm* (Barr & Tagg, 1995) and *Transmission Approach* (Prawat, 1992). The inadvertent consequence of practice typically leaves the acquisition of dispositions and characteristics to a type of educational osmosis of desired

abilities, knowledge, characteristics, habits, perspectives and behaviours. A *Curriculum Exposure Paradigm* would assume that exposure to a canon of content and discipline-experts (the curriculum) will be sufficient or perhaps even ideal for developing the desired learning, as long as inadequately prepared candidates are filtered out in advance. With respect to the *Liberal Arts* breadth and depth goals, outcomes are assumed to be mostly acquired through exposure to general education classes and elective requirements from other disciplines and areas, and passing the course is sufficient evidence of having achieved the outcomes. These paradigms are aligned with rationalistic reductionist or mechanistic principles in which complex structures can be reduced and understood by their component parts.

Empirical Thinking

Dewey (1991) uses the term *empirical thinking* to distinguish reasoning based on an empirical method from reasoning based on a scientific method. The empirical method relies on experience and observation alone. In contrast, the scientific method starts with experience and observation to form a hypothesis, but then moves on to experimentation and reflection on new experiences and observations in order to inform a new hypothesis. Empirical thinking parallels heuristic thinking.

Entitlement

A perspective or position regarding some right, or set of rights, being personally possessed, and expected to be adhered to by others, usually without regard for context or other considerations. The perspective commonly has a perception or assumption that the personal rights are above the rights and privileges of others, and therefore fairness demands that the rights be delivered. The perspective can be based on a sense of natural or systemic privilege.

Expert

A person seen as having a sufficiently comprehensive knowledge, metaperspective, and/or task expertise (Dreyfus & Dreyfus, 1999, 2004; Dreyfus, Dreyfus, & Athanasiou, 1986; Reigeluth, 1999a, 1999b) in a specific domain to distinguish them as reliable sources of exceptional, or definitive, performance for a given task. Unless a mantle of expertise is externally bestowed and accepted by some mechanism such as a degree or trades certification or a title, expertise is rated relative to performance observed or known by others. Therefore, in this study the word *expert* means someone who is perceived as having a proven record of reliable above average ability and perspective for defining and/or solving problems in the domain being referred to (an expert of/in). This definition focuses on experiential evidence and practical value rather than abstract domain knowledge or skill (Billett, 2001).

A *Successful Expert* signifies an expert that is distinguished by having a perceived reliable track record of successes (based on what is perceived as success). An *unsuccessful expert* might be someone considered an expert in a specific domain but a failure within a broader context in which that domain is situated, or perhaps relative to another domain that is more important or prestigious or relevant to the perceiver.

An *Industry Expert* signifies a person perceived as having a proven record of reliable above-average ability and perspective for defining and/or solving problems or being effective in critical and significant situations that would be considered common to the industry. As well, this expertise would have a perceived higher probability of being able to define and solve unusual problems within the industry.

Expertise, Vocational Expertise

The domain of a person's vocational practice that is constructed through their interactions within a vocational environment (Billet 2001).

Gap

Gap refers to a descriptor for the perceived differences between what graduates and novices possess and what employers' desire and need.

Heuristics, Heuristic Thinking

In psychology and in this dissertation the term is used as a descriptive category of thinking and reasoning strategies using readily accessible experience-based evidence that is primarily associational. Heuristics are used to analyze, judge, decide, and solve problems quickly and efficiently. These strategies tend to be tacit and automatic (i.e., thought patterns that are below conscious awareness are triggered, as opposed to thinking and reasoning strategies that are consciously chosen based on specific criteria or principles). What are labelled intuition and common sense are likely outcomes of heuristic thinking. Heuristics provide a valuable function that allows people to navigate through life efficiently and relatively effectively without requiring every mundane action and decision to be consciously considered. On the other hand, heuristic thinking results in biases that are often dysfunctional.

Laddering

Based on Bruner's (1960) concept of a spiral curriculum that is recursive and incremental. A spiral staircase is perhaps a more accurate metaphor for curriculum that circles through content at increasingly higher levels of complexity.

Passion Industry (profession, discipline, field)

An industry, profession, discipline, or field for which people have an intense motivation to be involved in because they consider it highly desirable for some reason other than monetary gain, for instance because it is glamorous, prestigious, intensely enjoyable (e.g., activities or environments), or aligned with their identity goals. Glamorous factors can include high social visibility and socially recognized power or influence. Glamour industries are a subset of Passion industries. Some industries labelled as passion or glamour industries include: (electronic) games, film and theatre (jobs include director, acting/performing), music/audio (production, writing, performing), photography, fashion (design, modeling), (technical) arts (e.g., animation, graphic art and design), fine arts, sports, journalism, and even politics. There is no definitive criteria but it is based on the supply of people who pursue careers and jobs in the industry based on their passion needs/goals rather than other needs/goals such as money or security.

Pipeline

The end to end linear production process for constructing a game that includes, within it, iterative processes, nonlinearities, and multiple complex dependencies.

Professionalism

Professionalism is characterized by a commitment to an identifiable higher calling, standard, or purpose than simply working for money, for example, a dedication and commitment to the mission and vision of a profession. The commitment is applied or transferred to specific entities such as the company, team, position, clients/patients, etc., in the form of behaviours and practices that adhere to standards agreed to or socially expected from the profession or calling or position.

Scaffolding

Based on the metaphor of a physical scaffold (Bruner, 1985; Wood, Bruner, & Ross, 1976), someone more advanced acts as a temporary support and helps to facilitate another person through a process, using tutoring for instance, until the person assimilates what is necessary to complete it on their own. Once the person is independently able, the support (scaffolding) is removed.

Success, Successful

The subjective perception of having achieved a sufficient number and quality of levels, standards, or criteria, of chosen or agreed-upon goals or purposes. Success is constructed from a sufficient number and type of perceived achievements.

Veteran

A person who is considered to be a long-term participant in the domain being referred to (a veteran of) and to possess a corresponding amount of experience and/or practice that is typically not possessed by those who have not been involved for as long. Because a veteran has been in the domain a long time they would almost certainly have lived through many issues, problems, conflicts, catastrophic events, dire straits, etc. (survived many battles), and therefore, likely acquired some type of expertise, but not necessarily so.

An *Industry Veteran* signifies a person who has been in an industry long enough to have experienced (and survived) most types of situations, particularly the critical and significant situations that would be considered common to the industry. Having long experience would most likely also mean they would have a lot of not-so-common experiences.

A *Successful Veteran* signifies a veteran that is distinguished by having a perceived reliable track record of successes achieved (based on what is perceived as success).

Acknowledgements

Special thanks to:

My supervisor Don Krug

My work and colleagues, especially Robert Prendergast

My family Justine and Sandy

My committee Dr. Stephen Petrina and Dr. Wayne Ross

Chapter 1 – The Gap Issue

The purpose and function of education has been a contentious issue in North American society for a long time (Egan, 2002; Suppes, 1995). But one perspective continues to grow in importance and visibility in media and political policy, and that is the increasing association of education's purpose and function with employment, improving the economy, and protecting a national competitive edge (ASTD, 2009; CCL, 2007; National Academies Press, 2007; The White House President Barack Obama, 2011). Yet, 30 plus years of research in what is commonly labelled *employability skills* consistently concludes that the education system falls short of producing graduates that meet employers' full needs (Cotton, 2001). Graduate shortfalls are not what might be expected however. What employability skills research consistently reports is not shortcomings in technical (hard) skills related directly to job tasks, but interpersonal and personal skills and higher order cognitive skills (Wentling, 1987). Here, a distinction is made between shortages of skilled workers and shortcomings in the skills of potential or current workers. As changes in global economics and technology escalate many believe that the gap between what graduates possess and what they need to succeed in work and life is growing wider (ASTD, 2009; CCL, 2006; Overtoom, 2000; Shaffer & Gee, 2005). The research presented in this dissertation examines this gap¹ issue (i.e., employability skills gaps as perceived by employers) through the perception of novice and expert characteristics by production team members in the game industry. The primary research question is whether or not production team members' perceptions align with the more general research on employability skills and expertise. The intention is to provide educators with a more complete understanding of the situation,

¹ Throughout this dissertation the word *gap* is used only as referenced here, that is, as a descriptor for the perceived differences and shortcomings between novices possess and what employers' desire and need. No deeper, additional, or theoretical meanings are intended.

through in-depth case studies, so that they might be better equipped to deal with the issues they face in developing effective curriculum for meeting increasing socio-cultural demands.

The case study research approach with a focus on perspectives from workers in the game development industry was chosen for a number of reasons. First, a significant amount of the employability skills research has examined issues from the corporate and traditional educational perspectives (ACE, 1997) or from perspectives within a specific company (Begel & Simon, 2008b; Hewner & Guzdial, 2010) but there has been little investigation into the perspectives of a cross section of front-line workers. Second, the game development industry was chosen because it is a leading edge industry relative to global economic and technological changes. A common reason given for widening gaps is escalating change (Schön, 1987; Shaffer & Gee, 2005) and therefore the game industry would fall on the leading edge of the gap issue. Third, using expertise as a frame of reference for interview questions was chosen because expertise is a broad concept that can accommodate many topics and perspectives that are directly relevant to the novice employee gaps as well as educational goals. Situating gaps in the context of workers' expertise levels may provide some clarity for curriculum outcomes and measures. The research question therefore focuses the investigation on whether or not the issues of expertise acquisition and novice shortcomings, as perceived by game development employees, align with the results from the general employment research. The purpose underlying this research is that an analysis of this comparison might provide insights that will be of some value to educators and curriculum designers and illuminate potential areas for further research.

Although Chapter 2 is the literature review, Chapters 1, 2, and 3 all include a level of literature review relative to the topics covered. Literature reviewed in Chapter 1 is related to the perceived issue of employment readiness gaps and some additional context, Chapter 2 is related

to research and theories regarding expertise and learning, and Chapter 3 looks at some theories and literature related to the ontological and epistemological biases of the researcher that impact the purpose, methodology, and analysis of the data. Chapter 1 also includes literature references to systemic issues that might be potentially relevant to the gap issue. Chapter 4 presents the results and analysis of the case study interviews and Chapter 5 continues with results that were deemed significant enough (beyond answering the research question) to warrant a separate chapter. Chapter 6 explores some potential implications of the research results and application for educators, and Chapter 7 summarizes the dissertation with concluding remarks.

Employability Skills Gaps From Employers' Perspectives

Studies into employment readiness from the early 1980s to the present, across thousands of companies and industries, and by various researchers and nations reveal that there is “a great deal of agreement among the skills and traits identified” (Cotton, 2001, para. 11) as missing in new employees fresh out of college and university. Based on research results from 63 sources including 41 research studies, reviews, and evaluations, Cotton concluded that US employers are troubled by what they perceive as deficiencies in entry-level applicants regarding a common set of basic, higher-order, and affective *nontechnical abilities* or *employability skills* that the employers consider more important than specific occupational or technical skills. All of the studies reviewed by Cotton identified affective traits as critical (see Table 1 and Table 2). Other literature reviews concluded that “employers have no quarrel with the skills performance of ... graduates, but they do have serious reservations when it comes to their nontechnical abilities” (Wentling, 1987, p. 354) and “improper work habits and attitudes rather than insufficient job skills or knowledge” (Beach, 1982, p. 69) were found to be responsible for 87% of firings or denied promotions. Out of 369 respondents to the ASTD (2006) survey almost 50% of

Table 1: Top Employability Skills	
Top Employability Skills summed and ranked per category (Cotton, 2001)	
Basic Skills <ul style="list-style-type: none"> • Oral Communications (speaking, listening) • Reading, esp. understanding and following instructions • Basic Arithmetic • Writing 	Affective Skills and Traits <ul style="list-style-type: none"> • Dependability/Responsibility [overall #1&2] • Positive attitude toward work [overall #3] • Conscientiousness, Punctuality, Efficiency • Interpersonal Skills, Cooperation, Working as a Team Member • Self-Confidence, Positive Self-Image • Adaptability, Flexibility • Enthusiasm, Motivation • Self-Discipline, Self-Management • Appropriate Dress, Grooming • Honesty, Integrity • Ability to Work With Supervision
Higher-Order Thinking Skills <ul style="list-style-type: none"> • Problem Solving • Learning Skills, Strategies • Decision Making 	

employers reported a deficiency in problem-solving ability and 96 % identified the largest gaps were in managerial/supervisory skills, communication/ interpersonal skills, and leadership/executive-level skills and emotional intelligence, for example, self-awareness, self-discipline, persistence, and empathy. Another report (Varon, 2006) paralleled the ASTD findings and blames “college curricula...[for not] changing fast enough to teach skills that businesses really need” (Para. 2). For additional evidence see the Conference Board of Canada Employability 2000 (Conference Board of Canada, 2000); HRSDC Essential Skills (Human Resources and Skills Development Canada, 2011); BC Business Council’s Biennial Survey of Employers (Business Council of British Columbia, 2004); Blueprint for Life-Work Designs (National Life/Work Centre, 2011); SCANS (Overtoom, 2000; SCANS, 1991); Carnevale, Gainer, and Meltzer (1990), the CHRC’s ongoing competencies and gaps research (Cultural Human Resources Council, 2011), DeSeCo-OECD (Salganik & Rychen, 2003), VET in the 21st Century Global Knowledge Economy (Kearns, 2004), and numerous articles on NCVER (2011). The *Task Force on High-Performance Work and Workers* report (ACE, 1997) that is

summarized in Table 2 is particularly relevant to the research presented in this dissertation because that study used similar questions and similar categories of participants: industry, education, and graduates, although the industry participants were senior managers.

Table 2: Employment Skills - Comparison of Three Reports 1997 - 2004		
Cotton 2001 (ranked within 3 categories)	Business Council of BC 2004 Top 5 skills & Top 5 Attributes (all Occupations)	“Task Force” 1997 Key attributes required for high-performance jobs
	A3 High Performance Standards A5 Customer Service Oriented S2 Leadership	Global Consciousness Leadership
Higher-Order Thinking Skills		Analytical Thinking
Problem Solving	S5 Problem Solving	Problem Solving
Learning skills & Strategies		
Decision making		
Affective Skills and Traits	S1 Interpersonal	
Dependability/Responsibility (overall #1&2)	A2 Accountable / Responsible	
Positive Attitude toward work (overall #3)	A4 Enthusiastic / Positive Attitude	
Conscientiousness, Punctuality, Efficiency		Time Management
Interpersonal skills, Cooperation, work as a Team Member	S3 Teamwork	Teamwork
Self-Confidence, Positive Self-Image		
Adaptability, Flexibility		Adaptability
Enthusiasm, Motivation		
Self-Discipline, Self-Management		Self-Management
Appropriate Dress, Grooming		
Honesty, Integrity	A1 Honest	
Ability to work with supervision		
Basic Skills		
Oral communications (speaking, listening)	S4 Speaking/Listening	Basic Communications Skills: listening, speaking, reading, and writing
Reading (e.g. understand & follow instructions)		
Writing & Basic Arithmetic		

Cotton (2001), along with numerous other authors and committees before and after (ACE, 1997; National Academies Press, 2007; Shaffer & Gee, 2005), conclude that there is an increasing need for soft² skills that reflects a significant change in the North American workplace, and that a failure to effectively equip youth will have far-reaching consequences. The changing workplace is not only increasing the soft skills gap but also adding at least one new skill: innovativeness (Conference Board of Canada, 2003a). The need for innovation is seen as being related to large scale global changes, but also with traditional maturation cycles within an industry. For example, a 2006 survey (Marsan, 2007) of 130 CIOs and IT executives identified similar skills gaps to those in the employability skills research and correlated these gaps with a maturing IT industry and its technologies.

Parts of Cotton's and Marsan's reports reflect a type of technology-skills life-cycle paradigm that occurs as industries mature. In other words, perhaps the implementation of new technology creates a shortage of technologists resulting in a priority need for technology expertise over other characteristics. As the field matures and more expertise becomes available, priorities shift to talent (typically creativity and innovation but also perceived intelligence), and then finally to soft skills. Ultimately, a minimum level of talent and technical skills become base level expectations and prerequisites to get an interview, and soft skills become the key determinates of long-term success. It makes intuitive sense that even in contexts where technical skills are desperately needed, people would prefer to work with people they like and trust and bond with, and with whom they feel they can accomplish great things. As Hoffman (2007) points out (see Table 3), divas are not well tolerated. Therefore, it is understandable that people who are perceived as hot-shots, self-centered, antisocial, and/or with dysfunctional entitlement attitudes

² Hard skills and soft skills are common terms in the literature but have gendered connotations (Spender, 1998).

may get hired for their technical ability, but they won't likely last long once an industry or company moves beyond the stage of desperate technical need.

There is a caveat to the diva issue however. Innovation and creativity are sometimes prioritized over other employability skills and/or technical skills (as if they were a type of scarce natural resource), and this seems to be more prevalent in maturing sectors where the need for innovation is increasing (Collins, 2001; Conference Board of Canada, 2003a; Schön, 1987; Shaffer & Gee, 2005; Shaffer, Squire, & Gee, 2005). Coincidentally, there is evidence that at a personal level, innovation often decreases as expertise grows and matures (Rabe, 2006). In addition, industries that rely on continuous innovation would be continually grappling with balancing their needs and wants between technical skills, talent, and employability skills throughout their life-cycle. The game industry is a prime example (Della Rocca, 2006).

Table 3: 10 Career-Killers to Avoid (Hoffman, 2007)
1. No life plan for career, personal-family, financial goals.
2. Not keeping skills current. ...technical, business and soft skills.
3. Failing to deliver results. It's all about accountability. With a position of entitlement you are guaranteed to fall by the wayside.
4. Confusing efficiency with effectiveness. ...importance of face to face connecting with others
5. Believing that you are irreplaceable. "There is no room for divas..."
6. Know it all. Huge constant change going on in the world today
7. Hanging with "brown-nosers" you need advisers who help you grow.
8. Forgetting to give credit to others. "Losers inappropriately take full credit for positive events despite the help or input received by others..."
9. Failing to self-promote. ...let your boss and leadership know your contributions and that you are a valuable asset.
10. Losing perspective. ...recognize shortcomings...remember <i>raison d'être</i> , vision, passion.

It is not known if the general research into employment skills and gaps applies directly to the game development industry, or any specific industry for that matter, nor if it represents the perspectives of the employees who actual work with novices. The general Employment Skills research typically enlists senior management rather than the people who work with novices. For

example, in a 1997 report (ACE, 1997) CEOs, Director of Training, and HR heads were interviewed in ten US corporations.

Based on my literature review I would say that some industries and academic fields do a significant amount of their own ongoing research using peers. Computing Science (CS) is one of these (Hewner & Guzdial, 2010; Lee, Trauth, & Farwell, 1995; Trauth, Farwell, & Lee, 1993). CS includes IT and Software Engineering and is generally considered to be related to game development as well. But in the Computing Science field the preponderance of research I found focused on technical skills and knowledge rather than soft skills (Trauth et al., 1993). This may partially be a reflection of the many university research partnerships with CS and engineering funded by commercial, political-military, and industrial interests (Bok, 2003; Geiger, 2004; Giroux, 2007; Slaughter & Rhoades, 2004; Washburn, 2005; Zemsky, Wegner, & Massy, 2005). If so, it is not surprising that the focus of skills gap research has been on technical skills that are required to keep up with the rapid technological changes and advances built into the R&D mandate. In addition, engineering, like medicine, has tended to be grounded in the practical and in close touch with the socio-political realms because of the direct potential impact the decisions and outputs from their field can have on human welfare. But ongoing research and curricula implementation of skill needs in CS does not seem to have made much of a difference to the employability skills gaps being discussed. According to a recent article “these studies have found a significant difference between the expectations of academics and industry...new developers had the technical skills to succeed, but had difficulty using the resources of their team and integrating into the company culture” (Hewner & Guzdial, 2010, p. 275).

Evidence from business literature gives an indication of how widespread the soft skills gaps are. The indication is that the same shortcomings found in novice employees are common

all the way up the corporate hierarchy, including the most senior level executives. In other words, though worded and contextualized differently, the same personal, cognitive, social, emotional, and behavioural issues that plague high school graduates plague executives. For example, the book *Crucial Conversations* (Patterson, 2002) concludes that over 20 years of research in management effectiveness reveals a skills gap and psycho-emotional avoidance tendency in all levels of management in relation to handling conflict. Though the book doesn't identify their solution as *assertiveness training*, it is essentially the same as assertiveness and conflict resolution skills espoused as basic life skills or soft skills for life and employment readiness, usually in the interpersonal skills category (Gibb, 2004; Salganik & Rychen, 2003). When the authors of *Crucial Conversations* were later commissioned by the US government to investigate the US Health Care system they found the same issues (Maxfield, Grenny, McMillan, Patterson, & Switzler, 2005). A large majority of health care workers reported working with people, including doctors, who break rules, don't follow directions, make ongoing serious mistakes, are not team players, and are disrespectful and abusive. Only about 10% of the workers were able to deal with these issues or even bring them up, even though the problem behaviours result in serious health risks to patients. This is especially interesting because Health Care education is highly regulated, has an accreditation process to ensure high standards, incorporates soft skills outcomes in the curriculum, and yet it has the same problems as the general work force. This is strong evidence that although regulation and accreditation may solve the technical skills standardization requirement it doesn't solve the soft skills issues.

Evidence from the employability skills research as well as my review of many business management and leadership books led me to wonder if there isn't something fundamentally wrong with how education and/or training is conceived or implemented for effective

development of core skills related to intra and inter personal development. Cotton's report concludes that employability skills can be taught but not with traditional methods of lectures and memorization. Suggested practices include making explicit the relevant goals and learning outcomes, democratic approaches requiring personal responsibility for learning, environments and tasks that simulate relevant features and contexts of real world work environments, high behavioural and learning expectations, and personalized learning based on students' needs and styles.

Employability Skills Gaps From Educational Perspectives

In popular discourse some argue that the failings of the North American education system and need for reforms are myths or exaggerations (Altbach, Berdahl, & Gumpert, 2005; Berliner & Biddle, 1997; Rosovsky, 1990; Rothstein, 1998; Schrag, 1997; Tyack & Cuban, 1995), but the preponderance of writing on the subject concerns a common negative theme in public and academic discourse (as a small sampling see Bloom, 1987; Bok, 2006; Côté & Allahar, 2007; Edmondson, 2006; Giroux, 2007; Graff, 2003; Hersh & Merrow, 2005; Sommerville, 2006). Although the specific nature of perceived educational gaps would likely vary greatly relative to stakeholder interests and philosophical perspectives on educational purposes, values, and rights, which in turn are influenced significantly by the stakeholder's socio-cultural-historical context or legacy and focus, there are common recurring themes that can be identified in the literature. Before I briefly overview perspectives from Egan, Schön, and Shaffer and Gee to exemplify this point, it must be noted that the discourses around employability skills gaps are not uncontested, and additionally, the framing and categorization of employability skills also has been critiqued.

The word *skills* is used in many ways and with different meanings and implications, for instance, cognitive, emotional, social, and sensorimotor skills. Technical skills tend to be sensorimotor or “hard” skills. A range of researchers and theorists refer to emotional and social skills as “soft skills.” Barrow (1987) on the other hand disagrees that emotional and social dispositions are actually skills in the sense that they consist of a finite set of behaviours, cognitive operations, or rules that educators can train students to use. Dispositions, values, and character qualities (impacted by levels of emotional maturity) are content and context specific and thus they are also not generic. He sees the educational application of emotional and social skills framed as technical skills, and particularly when unrelated to actual experience, as not only inadequate but potentially harmful. Hyslop-Margison (2000) takes Barrow’s points further by expounding on some of the serious issues that result from concepts and characteristics being erroneously classified as employability skills and co-opted for “functionalist objectives” (e.g., “objects of human capital rather than active epistemic agents” p. 6) that contravene the moral obligations of public education.

In addition to educational issues with the interpretation and application of employability skills research, there are also serious critiques of governmental interpretation and application. Hyslop-Margison and Welsh (2003) challenge the fundamental assumptions of career education policy (that are justified based on employability skills research). As mentioned in Chapter 1, one of the arguments that government espouses is that the education bar has to be raised in order to maintain a national competitive future. Hyslop-Margison and Welsh (2003) argue that career education policy is ideologically motivated to “deflect public attention from the systemic crises facing modern industrialized countries” (p.18) and that no empirical evidence supports these claims. Instead the evidence “suggests that the majority of present labour market opportunities

... are in fact situated in low salary, low skill, service occupations such as hospitality, food service, and retail.” (p. 10). If this is accurate, students entering career programs are being interpolated into this hegemonic ideology, which is taken-for-granted, adding to the complexity of vocational education situations.

Perceived educational purposes are important to an analysis of gaps since a gap implies an absence within prescriptive purposeful outcomes. Egan (1966, 2001, 2002) categorizes the primary purposes of western education over the last 100 years as 1) *socialization* into the norms and conventions of adult society (derived from Durkheimian socialization and Piagetian developmentalism); 2) understanding and thinking that models *reality and truth* (derived from the Platonic academic program); and 3) individual *self-actualization* derived from Rousseau’s humanism. Egan argues that there are a few primary reasons that educational systems or implementations have been unsuccessful in reconciling and accommodating these purposes. The first is a general unawareness of the underlying philosophies and ideologies that inform these purposes and their implementation. The second is the tendency to conceptualize the purposes in terms of outcomes or ends, rather than focusing on process or means, which renders them incompatible on a practical level even though there is no necessary logical incompatibility. I would add (see Table 4) that in North America Egan’s categories of *Socialization* and *Individual Self-Actualization* lean towards an economic vocational subcategory purpose (Bok, 2003; Zemsky et al., 2005), and when *socialization* is specified within a democracy, critical thinking is commonly identified as a required outcome of education (Dewey, 1997; Goodlad, 2009). The *Individual Self-Actualization* category can also include developmental purposes, and the *Reality and Truth* category is the basis of a myriad of approaches to curriculum from a classical disciplines approach such as *Core Knowledge* Education Theory (Hirsch, 2006), to science and

technical rationality as per Schön, to religious and philosophical approaches (Kronman, 2007a, 2007b; Rhode, 2006; Shapiro, 2005; Sommerville, 2006).

Table 4: Western Educational Purposes Based on Egan
<ul style="list-style-type: none">• Socialization (morality, ethics, citizenship, contribution, enculturation...)• Reality and Truth (metaphysics, meaning, religion, science, technical rationalism...)• Individual Self-Actualization<ul style="list-style-type: none">• human potential – individual, socio-cultural, species• critical thinking (for democracies, for self-actualization, emancipatory...)• vocation (socialization into roles, self-actualization, employability...)

The gap issue from Schön’s (1987) perspective has similar roots in assumptions and unawareness. Using examples from educational leaders over a 20 year period Schön demonstrates how the cause of gaps are commonly positioned in both public and academic discourse as a result of accelerating change in areas such as technology, environment, and information. Support for this assertion is evidenced in the previously referenced reports from Cotton, Shaffer, Education 97, and NAS 07. Additionally Schön identifies other usual suspects that include a decline in standards, rigor, and virtues, and an inability to produce specific content of and for practice. But for Schön the fundamental problem is “an underlying and largely unexamined epistemology of professional practice—a model of professional knowledge that is institutionally embedded in curriculum and arrangements for research and practice” (p. 8). Technical rationalism and scientific models of domain knowledge are core to this epistemology of practice that has produced rigorous but sterilized education, curriculum, and research, removed from the most important issues faced in practice. This epistemology of practice is also at the core of the gap issue, producing graduates that are unprepared to deal effectively with the realities they will face. Schön proposes *a new epistemology of practice* that uses *skillful practice* by domain relevant experts to model problem solving and innovation in the face of the messy

conflictual unique situations encountered in the *real world*. He proposes a reflective practicum approach to curriculum that builds expertise within the context of a community of practice (as per Lave and Wenger [1991]).

Shaffer and Gee (2005) position the massive changes taking place in the world as creating a crisis for western youth and, in agreement with Schön, see systemic issues in the structure and concept of education as hindering educational effectiveness and progress. “Young people in the United States today are being prepared—in school and at home—for ‘commodity jobs’ in a world that will, very soon, only reward people who can do ‘innovative work’ and punish those who can’t” (p. 1). They say that *innovative work* is not able to be standardized though, but, as Schön says, it is the work of reflective practitioners. Shaffer and Gee argue that education can be a solution if a break can be made from dichotomist thinking between liberal and conservative pedagogy. They propose a concept they have coined as *epistemic games* as the best solution. *Epistemic games* is defined and discussed in Chapter 2.

Curriculum Development for Game Related Programs in Higher Education

Protecting the philosophical foundations of higher education has created a longstanding resistance by some in academia to vocational or other non-research or non-academic type of subjects (Schön, 1995). Research interests in commercial and popular arts and entertainment exemplify this situation, and especially so for the study of games that is considered by many academics as second class or fluff (Squire, 2003). Games and entertainment in popular culture are often viewed negatively as time wasters, or worse as addictive and leading to violence. This perception is evidenced by the large amount of research on games and aggression (Anderson & Bushman, 2001). But research interest in game development skills and gaps have been growing (Begel & Simon, 2008a; Ficocelli, 2007; Hewner & Guzdial, 2010; McGill, 2008, 2009a, 2009b,

2010b), though the focus has been mostly on software engineering as it relates to game development programmers.

In considering the relationship between industry and education, the question of what needs to be taught for the industry as a whole is asked each and every time a post-secondary institution develops a vocational program and recruits students for it. Research and pre-planning for game-specific curricula is often based on industry involvement that falls on a continuum from hiring industry faculty and/or advisors, to soliciting industry members as consultants or advisors or experts in the Developing a Curriculum (DACUM) process, to relying on literature research, to copying other programs, to simply adding some game-focused activities or projects to existing programs without any contact with the industry (McGill, 2010a, 2010b). There is no standardization or regulation for how curriculum is developed, implemented, or assessed.

Based on my experience working with game developers over the last 10 years, attending the annual Game Developers Conference, participating in the International Game Developers Association (IGDA) education listserv, and from literature in the area of games and education (Baldwin, 2007; Buchanan, 2005; Carlson, 2003; Gee, 2003; Harris, 2001; Okan, 2003; Quart, 2001; Shaffer, 2005; Shaffer et al., 2005), there is considerable evidence that many developers and academics perceive a serious lack of understanding and communication between higher education and game developers. For example, in the above cited sources and in the IGDA: Education Special Interest Group: game_edu -- IGDA Game Education Listserv (<http://www.igda.org/game-education>) academics have often been accused of viewing game development myopically through their discipline and creating programs from that perspective without any direct knowledge or experience of game development. The problem is well expressed by a professor at a prestigious institution and co-developer of a top rated program with

full partnership relations with Electronic Arts (EA) who had this to say after a short time in residency: “It immediately became clear to me that neither EA nor academia have any real understanding of how the other operates” (Pausch, 2004, p. 3).

Proponents of game studies, game curriculum, and game based learning (GBL) in higher education have been slowly building their numbers, as evidenced, for instance, by the growing interest in events like the Serious Games Summit and the IDGA Education Summit, but even amongst proponents there is still much ignorance and many misperceptions. For example, in 2005 and 2006 I attended the IGDA Education meetings where university representatives from game programs and curriculum developers were still asking if there was, or what was the difference between a game programmer and a game designer. In the past, a number of Computer Science (CS) programs, faced with dwindling enrolments, attempted to attract students by adding a few game courses to their programs (Hewner & Guzdial, 2010; Morrison & Preston, 2009) and advertising them as Game Design programs. This type of activity infuriates developers as well as academic advocates of game studies. Based on the discussions and articles within the industry and Game SIGs this is still a problem. For instance, the IGDA published an article in August 2010 stating that

many people outside the games industry still equate “development” with programming, and many still think game creation consists mainly of programming. ... Often, the school begins to teach some form of game development because it is losing technology students at a rapid rate and needs something to bring them back ... one East Coast university ... had no intention of hiring anyone for the new curriculum, so courses were unlikely to have instructors with games industry experience. This is quite common. Few people teaching game development actually have industry experience. (Pulsipher, 2010, para. 5)

In another example, a recent argument surfaced between a developer/educator and a department head from a well-known university who

insisted computer network engineers were qualified to teach game design. [to which the developer replied] Consider the film industry’s response to academia if most film studies

were taught in Physics Departments because making a film requires a knowledge of optics ... what would painters think of academia if art was taught by chemical engineers? ...Or consider the field of literature and academia. One of the basic considerations for a professor to teach literature is that he or she has actually published works of literature. Yet, what percentage of professors that teach game studies have ever had a game commercially published? (Baldwin, 2007, para. 3)

If programs are indeed being developed without appropriate expertise it is not surprising that graduates would have gaps in their technical skills and their epistemological perspectives in addition to the more common soft skills gaps.

Observations on the Nature of Employability Skills Gaps

What strikes me as I review and research employability skills are the similarities and connections between abilities, skills, processes, cognitive-emotional-biological levels, and perceptual and/or behavioural dysfunctions across various domains of research. In other words: employability skills and gaps, creative and practical skills (e.g., Egan and Sternberg), and specific levels of developmental abilities (Baxter Magolda, 1999; Chickering & Reisser, 1993; Kuhn & Dean, 2004; Sternberg & Subotnik, 2006) at least across two of Kegan's (1982) developmental levels seem to have significant parallels, and in fact seem to be different perspectives on the same phenomena. In addition, the acquisition of expertise (Ericsson, Prietula, & Cokely, 2007a) parallels innovative reflection in action (Schön, 1983; Shaffer & Gee, 2005). Authors within these perspectives do not articulate the equivalencies or use identical terms and concepts (though many are indeed identical) but at a meta-level they seem to be of the same type and category and all are primarily about the development of the person (e.g., cognitive and emotional maturity), and abilities such as social and communication skills (as distinct from learning a body of knowledge or technical skills). As well, the higher developmental levels/stages/abilities seem to align well with the core academic intentions and purposes

underlying the academic disciplines, human potential, and democratic citizenry, in addition to vocational education that is being demanded by employers.

Desired employability skills that are common across numerous fields include social goals such as communication, collaboration, and contribution. Common personal development goals include what I would label balanced self-determined identities and emotional maturity / intelligence. Common cognitive goals include critical thinking. The scope of this dissertation does not warrant a full examination and comparison of employability skills with outcome gaps as perceived from numerous educational perspectives, but because the correspondence within the cognitive realm might not be as obvious as in the social/interpersonal and developmental realms I will explore the cognitive goal of critical thinking in more depth, which will also serve to illuminate further some of the core issues that may perpetuate gaps (across realms).

Critical thinking as a case study of gap issues. I found that a comparison of the general meaning of critical thinking, as a goal of education, was surprisingly very consistent between the public (Marquardt, Moss, Watts, Whittam, & Chudnovsky, 2003), government (British Columbia, 2006), academia (Facione, 2011; Kuhn, 2005; Kuhn & Dean, 2004), and business (CLPNBC, 2001; Conference Board of Canada, 2000, 2003a; Lavalley & Wilson, 2006). There were also consistent complaints about gaps in graduates' critical thinking by the same stakeholders, with some authors, such as Bloom (1987), arguing that critical thinking is no longer valued and pursued in society and education.

As highlighted by Schön, one area of tension in academia arises from the emphasis on, or privileging of formal logic, technical rationalism, and scientific thinking over other types of reasoning and ways of knowing (Belenky, 1997). Some of this tension could be based on territoriality and some could come from defensiveness or overreactions to the privileged position

of rationalism and scientism. Conflicts might also exemplify Egan's argument (previously presented) that issues arise from the focus on ends that juxtapose perspectives as dichotomies. Complexity theory, for example, is able to hold both formal logic and other forms of reasoning as valid non-contradictory parts of a whole. "Complexity thinking argues, humans are not logical creatures, but association-making creatures who are capable of logic" (Davis & Sumara, 2006, p. 35).

Based on Davis and Sumara's quote, complexity theory would see association-making, rather than formal logic, as the default reasoning process for humans. Associational reasoning is also the basis of what is termed heuristic thinking (as defined in this dissertation; see Glossary), and there is considerable research supporting heuristics as being closer to a default thinking process than formal logic (Bransford, Brown, & Cocking, 2000; Regehr & Norman, 1996; Reisberg, 2001; Yilmaz & Seifert, 2009). As Reisberg (2001) has pointed out in reference to heuristic thinking,

errors in logical reasoning are extremely common, and the errors don't look at all like the product of carelessness. Instead, there is a systematic pattern to the errors...our reasoning is guided by certain principles, but the principles are not the rule of logic! Put differently, it appears that scholars have simply been mistaken when they have argued that systems of formal logic describe the actual rules of thought. (p. 417)

Heuristic thinking is also mostly tacit. Given the default and tacit characteristics, heuristic thinking may help to explain the improvements in critical thinking that aware metacognition (about heuristic thinking itself) and explicit education produce for effective evaluative processes (Landa, 1999).

The legacy of technical rationalism, scientism, and formal logic can be viewed, at least partly, as a reaction against the weaknesses of heuristic thinking in the first place (via the Age of Enlightenment). But heuristics seem to be generally effective and efficient for everyday life, and

particularly in situations of uncertainty (Tversky & Kahneman, 1974). Uncertainty would be characteristic of complex multivariate situations as well as circumstances with limited access to information or limited time to process and apply purposeful reflection and formal logic. These are situations in which experts often shine, and judgment and decision research as well as Cognitive science research both include heuristics as a large part of the *expert's* reflective practice and tacit knowing (Regehr & Norman, 1996; Shanteau & Stewart, 1992). Some cognitive science research (Reisberg, 2001; Shanteau & Stewart, 1992) concludes that expert heuristic thinking is able to produce superior results because of the large amount of associational content gained from years of experience. The large experiential data significantly increases the probability of accurate assessments when applied to similar situations.

Heuristics are also relevant in explaining why expert abilities such as problem solving and exceptional recall don't transfer outside of the expert's domain (Bransford et al., 2000; Chase & Simon, 1973; Farrington-Darby & Wilson, 2006; Reingold, Charness, Pomplun, & Stampe, 2001; Reisberg, 2001; Reynolds, 1982). Experts in one field don't necessarily do any better than novices when placed in unfamiliar domains or in random unrelated or irrelevant contexts or tasks within their domain. Their average performance may be due to their memories and schema having few or no associations within the new domain (Bransford et al., 2000; Reisberg, 2001). Similarly Schön (1987) argues that teaching formal logic and technical processes for solving theoretical and/or artificial problems does not translate into actual practice because the problems are too simplistic compared to the typical complexity of practice. From a heuristic perspective this could be explained as an insufficient amount of relevant experiential practice to establish a representative schema, therefore, there is an insufficient number of

connections formed to trigger an available set of analogies (i.e., the analogy heuristic is not triggered).

The research is also clear that reasoning that *will* transfer across domains, contexts, disciplines, or industries can be taught and learned. Again from Reisberg (2001):

humans can reason well if the problem somehow triggers the appropriate skills...Is it possible to train people so that good-quality reasoning is more easily triggered? The answer is 'yes.' [But]...performance is little influenced by training in logic: there is little impact from a...full undergraduate course in logic, or even years of graduate training. In marked contrast, just a few minutes' training in the use of reasoning schemata *does* improve performance even with arbitrary problems. (p. 426)

Critical thinking is a commonly cited goal of education, as is a level of expertise in certain subjects, but conflicts and gaps can arise when critical thinking is defined as exclusionary or oppositionally to heuristic thinking, even though heuristic thinking is considered a key component of expert reasoning. Sternberg and Grigorenko (2004), and Sternberg and Subotnik (2006) claim that evidence from recent research into intelligence and reasoning challenges generally accepted core perspectives regarding intelligence and epistemology that educational systems and pedagogy have been built upon. They argue for a systemic change using a much broader and more useful concept that they have coined *successful intelligence* that defines various intelligences, ways of reasoning, and therefore critical thinking, according to situational applicability, and acknowledges heuristics and formal logic as both legitimate within specific contexts.

Systemic issues. The conflicts regarding critical thinking as just discussed can be seen to support Schön's argument that formal logic and technical rationalism hold systemic positions of privilege in academia that produce obstacles and resistance to certain types of learning outcomes through systemic epistemologies of practice. The discussion was intended to provide some insight into the complexity of issues that might impact and perpetuate gaps. But the discussion

also leads to another question: how much effect do systemic factors have on the gap issue, and what other systemic factors might also hinder curriculum effectiveness for addressing them?

Before moving on to Chapter 2, I will explore potential systemic issues a bit more.

I have found that authors in all research areas related to expertise and employability skills argue that intentional education can facilitate the development and acquisition of employability skills. Expertise can be accelerated through directed practice (Ericsson, Roring, & Nandagopal, 2007b), development of the whole person can be supported by holistic educational environments (Baxter Magolda & King, 2004; Chickering & Reisser, 1993), successful intelligence can be facilitated and learned (Sternberg & Grigorenko, 2004), employability skills can be taught (Cotton, 2001; Wentling, 1987), the prerequisites to learn and the skills to practice reflection-in-action can be facilitated (Schön, 1987), effective problem solving heuristics and critical thinking skills that transfer across domains as well as metacognitive skills can be facilitated (Bransford et al., 2000; Byrnes, 2001; Kuhn, 2005; Kuhn & Dean, 2004; Reisberg, 2001), passage through life stages and developmental levels can be supported and facilitated (Egan, 2002; Kegan, 1982; Pascarella & Terenzini, 2005), and meaningful transformative (Baxter Magolda & King, 2004; Mezirow, 2000) and emancipatory learning situations can be effectively designed (Brookfield, 2005). On the other hand, there is a considerable consensus among the above authors that the educational goals they are proposing are difficult to achieve in an ideal environment, much less when faced with resistance and systemic issues whether ideological, structural, epistemological, or methodological. Consider for instance Goodlad's (1994, 2009; Goodlad, Sirotnik, & Overman, 1979; Shane & Goodlad, 1978) research findings over the past 40 plus years (starting prior to his 1970 eight-year study) upon which he critiques the same systemic issues in education structures and politics that continually sabotage real change and the effectiveness of school

reform. “Over more than 60 years, the problems remain essentially the same, and the solutions remain essentially the same” (Goodlad & Goldberg, 2000, p. 82).

One reason why change is elusive may be systemically related to how issues are understood and labelled. Heifetz (1994) argues that leadership decisions commonly suffer from the tendency to categorise problems as technical when they are often complex adaptive problems. He cites educational issues and education reform as exemplifying this situation. If employability skills gaps are understood as technical problems in which students lack knowledge or skills, or in which students are deficient in fixed traits (Bloom, 2010) such as a low IQ (Perkins, 1995; Shenk, 2010), then there is a certain logic to admissions practices that filter out students with disqualifying traits (such as low IQ; see the discussion on admissions in Sternberg, 2010) and educating the rest. If Heifetz and Bloom are correct then viewing and treating employability skills in this way would be common. But some of the literature I am presenting in this dissertation points to employability skills gaps as involving more dynamic complex variables such as cognitive, social, and emotional developmental levels with capabilities that are elastic and able to grow and evolve through interactions between the agent (embodied mind) and its environment (Dewey, 1991; Shenk, 2010). For example, Kegan and Lahey (2009) use a complex adaptive theoretical framework to explain adaptive solutions to developmental change. In alignment with Heifetz’s argument, perhaps one of the failings of the education system to meet employer expectations is that employability skills problems and solutions have been primarily viewed as technical. If that is the case, the failing may be exacerbated in North America by a tendency to privilege the ideology of autonomous individualism and to associate it with fixed traits such as smart, independent, powerful, innovative, resourceful, and self-made.

Schön is referenced extensively in this dissertation, but I find some aspects of his proposed solutions to be still conceptualized within existing systems to a degree that may ultimately render them ineffective. For example, his focus on educating professionals within the limited scope of disciplines in the applied sciences seems to me to be too narrow for the current work environment. In expressing the core constructs of gaps (as he views them) as tacit abilities acquired over time Schön (1987) uses terms like wisdom, talent, intuition, and artistry. He argues that the disciplines based in applied science should look to what he calls the “deviant traditions” (p. 16) of the professional schools and fine arts, such as music, dance, visual and plastic arts, for examples of experiential learning and apprenticeship models that facilitate this artistry/wisdom. I see significant differences in the constructs and related levels of expertise and intelligence for artistry/wisdom (that include soft skills and employability skills), practical/successful intelligence and heuristics, and professional practice that includes occupational technical skills and their related intelligences and heuristics. If various types of intelligence have different associated heuristics for critical thinking and problem solving, for example, practical intelligence verses general intelligence (Cianciolo et al., 2006; Grigorenko et al., 2004; Sternberg, 1988; Sternberg & Subotnik, 2006), then I see three reasons why there is a necessity to explicate and accommodate these constructs in curriculum design.

First, expertise acquired through professional practice tends not to transfer to other domains or contexts as previously referenced. Therefore, effective interpersonal competence is not likely obtainable in the context of a set of management skills learned in either a practicum or professional practice without explicit modeling and mentorship.

Secondly, considering the research that suggests it takes 10 – 20 years of deliberate practice to reach an expert level of competence (Ericsson, 2000b), it is an impossibility to reach

that level for more than a few career areas or jobs. But the US average for late baby boomers is 11 jobs between the ages of 18 to 44 (U.S. Department of Labor, 2010). There is clearly a need for improving transferability of expertise factors. Thirdly, assuming an acceptance of the argument that most aspects of life are becoming more complex and require a higher level of skills to maintain a balanced functional successful experience (Johnson, 2005; Kegan, 1994), and that personal life affects work life, then the development of general life skills beyond or outside of professional practice is critical for successful personal and work life.

Other systemic educational issues . Prior to the 1970s a generally accepted assumption was that development ended in adulthood around age 18 and remained constant or declined from that point (Demick, 1994 ; Hoare, 2006a; Hoyer & Rybash, 1994; Kitchener, King, & DeLuca, 2006). The belief helped to sustain an essentialist perspective that since everyone had reached adulthood, deviance was mostly attributable to character flaws (Hoare, 2006b). Adult development research over the last 30 years refutes these previous beliefs. Adults can continue to develop in many ways, but particularly in soft skills and cognitive ability, and employability gaps are not a reflection of character flaws but can arise from many factors. But the current trend is not towards more maturity by age 18, but less.

There is growing evidence that youth are increasingly putting off adulthood, that is, putting off traditional adult experiences. In 2006 58% of 20–24 year olds, 26% of 25–29 and 11% of 30–34 year olds lived at home in B.C. compared to 20% of 20-29 year olds in 1981 (British Columbia, 2011). A Canadian study (Finnie, Mueller, Sweetman, & Usher, 2008) found that about 54% of students don't complete their first choice post-secondary programs after self-reporting that the program or field was not a fit for them. Within three years 40% to 50% return, presumably after gaining some life experience and awareness about what suits them.

Another reported trend in post-secondary demographics is an increasing percentage of what have traditionally been considered underdeveloped psycho-social abilities, or said differently, an increase in mental illness and emotional behavioural disorders (Gallagher, 2010; Twenge, Campbell, Hoffman, & Lance, 2010a; Twenge & Foster, 2010; Twenge et al., 2010b), in addition to perspective shifts such as an increase in narcissism (Twenge & Foster, 2010) and a lower perceived need for a life philosophy (Twenge et al., 2010b). In light of these trends it is questionable whether young post-secondary students, in general, are able to meet expectations of adulthood education.

Suggested causes for the above trends include socio-cultural shifts, specifically the focus on and privileging of materialism, status, individualism, choice, and extrinsic goals, which create more anxiety, stress and pressure (Kegan, 1994; Nathan, 2005; O'Brien, Hsing, & Konrath, 2010; Small & Vorgan, 2008; Twenge et al., 2010a; Twenge & Foster, 2010; Twenge et al., 2010b). Simultaneously society is seen as abandoning practices and values that instil intrinsic goals people have traditionally relied on for emotional and mental support in times of stress and need, such as community, meaning, and affiliation (Martin, 1996; Nathan, 2005; Ramsey & Watson, 1996). The use of extensive media and particularly the rise of social media combined with assimilated socio-cultural pressures to be competitive and successful are also suspected causes (Konrath, 2010; O'Brien et al., 2010) as is the use of the technology itself (Small & Vorgan, 2008). Acquired Attention Deficit Disorder or AADD and Attention Deficit Trait or ADT were coined to describe conditioned responses to environments with excessive, relentless and accelerating multidimensional demands on attention, which characterize modern North American technologically mediated society (Hallowell & Ratey, 2006). Whatever the perceived causes, there is general agreement that the demands of life and work realities are changing

rapidly at the same time that the needs of the students being prepared to participate in life and work are also changing.

It seems likely that as the total percentage of student social and mental health issues increase, the size of the employability gap and the need to close it will also increase. But major objections to the inclusion of soft skills development³ in education have been around for a long time and include the belief that it is outside the scope of the education system; that soft skills shouldn't be separated out of the curriculum; that these types of skills can't be taught; or that there is not enough time or resources to teach them (Gilbert, Balatti, Turner, & Whitehouse, 2004; Hawke, 2004; Hyland & Johnson, 1998; Wolf, 1991). But many studies on the treatment of even severe mental illness show that nearly everyone can learn the skills that they need to function successfully in society (Boyatzis, Stubbs, & Taylor, 2002; Greenberg et al., 2003).

Positive psychology research results have shown that not only can important soft skills be taught, but also that teaching *positive psychology* (rather than focusing on fixing problems) will alleviate a significant portion of problems in school and afterwards in life and work, while simultaneously improving hard skill acquisition and performance (Seligman, 2009). There is also a significant amount of research (Baxter Magolda, 1999; Mayer, 2009) that gives evidence for the efficacy of integrating interventions into curriculum rather than adding courses or programs, and that a base level of integration can be accomplished with little increase in costs and resources (Greenberg et al., 2003).

Regardless of whether or not educators buy into the research presented above, if the psycho-social problems are growing, the educational system will be facing these types of issues one way or another in the future. In the meantime, current employers are still saying that some

³ What I am discussing here is not what is called *character education*, which is more about indoctrinating students into mainstream values and ideologies. See (Kohn, 2011)

post-secondary graduates are spending four years in school without being prepared to directly enter the workforce, and private career-college graduates are spending 1-3 years without being directly prepared for long-term success. Perhaps, as Schön (1995) says, there is a need for a new epistemology of practice.

Chapter 2 - Literature Review

Chapter 1 reviewed the perceived issues and needs that are the context for the research in this dissertation. The literature and research on employability skills was covered fairly extensively in that chapter and therefore, the focus in Chapter 2 will be on expertise and its acquisition in educational contexts. Expertise is a cross disciplinary topic that includes an enormous amount of research. To keep the review manageable only a few very select topics within the field are reviewed based on what was deemed to be most relevant to vocational education, specifically some of the psychology research and some of the uses of the term in educational contexts. The research intention is not to redefine or question expertise but to provide a context for conceptualizing expertise-acquisition as understood by game developers in a way that can eventually be applied to improving curriculum design. In other words, the objective of the review is descriptive, practical, and critical.

Following a brief overview of some of the research and literature on expertise, I have chosen a number of education related theories and models to present that I believe might provide some relevant insights into the issues and solutions of expertise acquisition and gaps in addition to having potential value for curriculum developers who might try to experiment with ideas that emerge from this research. Because the employability skills literature was clear about gaps falling outside of technical skills and into the areas of personal, social, and cognitive skills and abilities (including attitudes and perspectives), I tried to consider theories that accounted for as many of these ideas as possible, and, as much as possible, were also relevant to expertise acquisition. The theories chosen are by no means exhaustive but they provide some context for considering the perceptions of interviewees and the applicability of alternative delivery models. The main models covered in this section are the algo-heuristic model, cognitive flexibility,

cognitive apprenticeship, enactivism, holism, transformative education, and developmental theories. These models influenced both the design and analysis of the research in this dissertation.

Expertise

Expertise acquisition is one way of conceptualizing a vocational education objective. In this context curriculum objectives for graduates would include entry-level expertise (into an industry or career) and a foundation set of knowledge and skills that will sustain continuing and, hopefully, accelerated advancement of expertise in the appropriate areas of interest to the employer and graduate. Many authors, such as Sternberg, Gardner, Bloom, and Vygotsky, address parallel ideas and make recommendations for education, but they do not address the context of skills expectation gaps or professional expertise as Schön and others do (Daley, 1999; Laske, 2006; Schön, 1983, 1987). The *triarchic intelligence theory* (Sternberg, 1988, 1997; Sternberg & Grigorenko, 2004; Sternberg & Subotnik, 2006), for example, identifies creative and practical intelligence as requirements for functional, or perhaps pragmatic intelligence that maximizes a student's ability to be successful as they define it in life, but not specifically as it relates to employment gaps

Expertise as found in psychology literature (e.g., Ericsson, 2000a; Ericsson, 2000b, 2005, 2007; Ericsson & Lehmann, 1996; Ericsson, Nandagopal, & Roring, 2005; Ericsson et al., 2007a; Ericsson et al., 2007b), and specifically in Schön's (1987) educational perspective, parallels what has been named the capability model that conceptualizes capability as a set of holistic competencies applied to innovation and problem solving in complex new and unknown situations (Hase & Kenyon, 2007; Stephenson, 1994; Stephenson & Weil, 1992). I would not consider Schön's theory as holistic, but it specifically addresses vocational expertise gaps in

post-secondary graduates calling for experiential real-world and/or simulation practicums with expert mentors. Evidence in support of Schön’s solution includes Ericsson’s (2000a) cognitive psychology research that indicates exceptional performance is primarily a result of “deliberate practice” (p. 1), which produces extensive and rich mental models. Novices do not have the depth and breadth of neural connections for new information, nor to trigger understanding and perception beyond a surface level, and so information tends never to reach long-term memory. Focus stops at surface features that are encoded according to everyday schemata, thus making even their unreliable and limited knowledge mostly irrelevant (Reisberg, 2001). Expertise attained through unfacilitated practice can take 10 to 20 years or more (Ericsson, 2000b). It is no wonder that some IT companies seek 5 to 10 years of experience (Marsan, 2007) and game development companies regularly headhunt other development companies for experienced and proven expertise. But both Schön’s and Ericsson’s work support the position that the acquisition of expertise can be accelerated through facilitation of *skilful* and *deliberate practice*, and that the perspectives and abilities that support achievement can also be facilitated and learned (McAuliffe, 2006).

Dreyfus and Dreyfus’ (1986, pp. 16-51) classic model (Tables 5-6) of expertise offers a productive way of understanding distinctions between novices and experts. This model provides a nuanced progression often missing from discussions or research on expertise. Journeys, progressions, or transitions from novice to expert are neither linear nor smooth and aims are transformed along the way (Table 5). People process elements of a situation differently,

Table 5: Aims of Skill Acquisition and Expertise (Dreyfus & Dreyfus, 1986, pp. 16-51)					
	Novice	Advanced Beginner	Competent	Proficient	Expert
Aim	Accuracy and Acceptance	Accuracy and Independence	Fluency and Independence	Fluency and Demonstration	Characterization

Table 6: Characteristics of Skill Acquisition and Expertise (Dreyfus & Dreyfus, 1986, 1989, 2004)					
	Novice	Advanced Beginner	Competent	Proficient	Expert
Processing Elements of a Situation	Sees only those that are clearly and objectively defined	Perceives similarity with prior examples	Reflects upon various alternatives to goal	Intuitively organizes and understands task without decomposing it into component features	Intuitively organizes and understands task without decomposing it into component features
Rules of Behavior & Decision-Making	Follows clear procedures and rules	Transfers from one situation to another	Analytically calculates choices that best achieve goal	Consciously focuses on choice that best achieves intuitive plan	Acts in an unconscious automatic, natural way
Exercising Judgment	Minimal	Minimal	Consciously deliberates	Acts based on prior concrete examples in a manner that defies explanation	Unconsciously does what normally and ethically works

depending on aims and characteristics of skill acquisition. Novices will focus on individual elements of a situation where someone more competent or proficient will process a range of elements simultaneously. Novices approach procedures much differently than proficiently and expertly skilled individuals. In a skilled situation, novices require explicit directions and rules and will adhere to only the objectively defined rules or context-free features. Dreyfus and Dreyfus use an example of learning to drive a standard transmission (stick shift) vehicle, where a novice is given context-free rules such as shift from first to second when the speedometer reaches 15 kph. Merely following these directions will often result in poor performance. Shifting on a hill or a heavily loaded vehicle will require an adjustment to the rule. Subsequent levels or stages of skill acquisition require directions as well as contexts (Dreyfus & Dreyfus, 1986, 1999, 2004). Similar to Lave and Wenger's (1991) findings on apprenticeships, novices acquire skill

and the types of skill they acquire are dependent on an array of factors that are more cultural and social than psychological. Apprentices are immersed in a community (artistic, design, educational, gaming, etc.) where they learn the norms and practices of their work. The process is one of enculturation and socialization, as well as it is a cognitive or affective process. Within these models, novices acquire soft skills along with fine motor or technical skills (hard skills). The two are inseparable. Where novices and advanced beginners exercise minimal judgment over skilled task situations, those in proficient and expert stages exercise conscious, deliberate judgment over tasks and automatically act on their judgment.

The algo-heuristic model also demonstrates facilitative and deliberate practice effects for expert problem solving with dramatic positive results (Landa, 1999), and proponents of game based learning (GBL) argue for the potential of games and simulations as a far more effective methodology for the future of education (Aldrich, 2011; Becker & Parker, 2007; Bryce, 2001; Cohen, 2006; Dempsey, Haynes, Lucassen, & Casey, 2002; Gee, 2003; Gibson, Aldrich, & Prensky, 2007; Hollins, 2003; Johnson, 2005; Kevin, 2002; McGonigal, 2011; Mungai, Jones, & Wong, 2002; Pope & Bogart, 1996; Prensky, 2006; Quinn, 2005; Saunders & Smalley, 2000; Shaffer, 2007; VanDeventer & White, 2002).

Schaffer (2005) and Gee (Schaffer & Gee, 2005) have proposed what could be considered a new paradigm for GBL, called *epistemic games*, that integrates sociocultural epistemology as an inherent structure of the game and its mechanics. As the concept relates to Schön's position and expertise, *epistemic games* can be thought of as a type of professional virtual practicum in which participants take on various roles and goals that necessitate their involvement and interaction with characters and game play that embodies the rules, values, knowing, and ways of doing and being (epistemic structures and frames of reference) of particular communities of

practice, such that they learn to work and think in ways successful to the epistemic structure.

Shaffer and Gee (2005) say that

in this approach, students do things that have meaning to them and to society, supported all along the way by structure, and lots of it—structure that leads to expertise, professional-like skills, and an ability to innovate. So we have the immersion dear to liberal pedagogies and the structure dear to conservative ones. (p. 12) ...Epistemic games are fun, but they are fun because they are about innovation and mastery of complex domains. ...Epistemic games are rigorous, motivating, and complex because that's what characterizes the practices of innovation upon which they are modelled. (p. 16)

Although I have the highest regard for the concept of *epistemic games* I have a couple of criticisms of Shaffer and Gee's perspective. The first is the same critique I applied to Schön, that their focus is too narrow. I agree that epistemic games can be a solution to the coming crisis of preparing for an innovative job. But the crisis is much larger than that and not just about jobs, but about multiple career changes and transferability of skills to different epistemic structures and achieving a balanced self-determined life. My second criticism is the assumption that communities of practice know how to replicate themselves effectively or appropriately. Shaffer, Squire, and Gee (2005) say that "doctors know how to create more doctors; lawyers know how to create more lawyers; the same is true for a host of other socially valued communities of practice" (p. 7). My experience and research leads me to question this. Maybe the system reproduces mediocre and/or dysfunctional doctors and some manage to become great doctors in spite of the system. Perhaps the system reproduces the status quo and the existing power relations that doctors kowtow to. The previously mentioned US government sponsored research into health care certainly lends evidence to this view. Shaffer and Gee could perhaps improve their vision with a bit more critical theoretical perspective. There is also a practical issue with the concept. Shaffer mentions that an in-depth analysis and understanding of the epistemic framework, such as knowledge structures and creation processes, are needed to design an

epistemic game. I conversed with Shaffer regarding how this could be accomplished and he had no answer (personal communication, April 1, 2009). It is a problem. But given it could be done, from whose perspective are *problems* to be named? As per Schön, (1983) naming and framing define both the problem and the solution but are based on pre-existing epistemologies and assumptions.

These criticisms aside, epistemic games appear to have the potential to address the issues presented in Chapter 1. Epistemic games just may possess the unique blend of attributes that can be used to facilitate the acquisition of expertise required by industry, society, and individuals.

Algo-heuristic, cognitive flexibility, and cognitive apprenticeship theory. By definition vocational programs intend to facilitate some level of relevant skills or ability, or said differently, some level of expertise. In considering how best to facilitate a sufficient level of expertise within a few years or possibly even less, there are three theories that address specifically relevant aspects of this problem. The first is algo-heuristic instructional design theory (Landa, 1976, 1999), also called Landamatics. The algo-heuristic method uses an explicit recursive process to identify all relevant mental processes (conscious, unconscious, and heuristic) that are associated with expert problem solving. The curriculum methodology then builds expertise through a set of increasingly complex problems that require an incremental addition of processes to the mix. The process and research instruments used for discovery of expert mental processes has been developed and refined over many years and could perhaps be used in discovering the epistemology of expert practice that is required for epistemic GBL. Unfortunately Landa passed away without apprentices, associate researchers, or significant write-ups to his experiments and research and the practice of the algo-heuristic model will probably be lost to the world. But Landa's results provide evidence that accelerated development

of expertise within an epistemic domain or discipline or field can be facilitated, as well as emphasize the importance of making heuristic thinking explicit as part of expert problem solving.

The second theory, cognitive flexibility (Spiro, Coulson, Feltovich, & Anderson, 1988; Spiro, Feltovich, Jacobson, & Coulson, 1992) is relevant because it provides a perspective on defining and facilitating the acquisition of expert processes involving creative and/or emergent problem solving. It distinguishes problem solving for simple and complex situations that can also be either well-structured or ill-structured. Because of its focus on context relevant processes, it is considered a potential solution for addressing transferability across domains (Jacobson & Spiro, 1995). Cognitive flexibility might be a valuable perspective to consider when constructing curriculum or simulations that intend to build expertise through increasingly complex and ill-structured scenarios.

The third theory aligns with Schön's recommendations. The cognitive apprenticeship model (Collins, Brown, & Holum, 1991; Nielsen, 2010) places knowledge and application together in context by using the mentorship of experts to facilitate what would be called epistemic learning in an epistemic game, along with specific skills and knowledge acquisition. Content includes not only domain specific knowledge, but also strategies for control, learning, and heuristic procedures. In this model, student learning should always take place in a context that starts with the big picture and includes observation along with mentored exploration, practise of specific skills, and reflective practices. Support and direction are used to help learners progress through increasingly complex and diverse problems that are relevant to the community of practice they are being integrated into, while also paying attention to learners' motivations (Makgato & Mbanguta, 2002).

Incremental development of specific abilities and perspectives is a key feature of these theories and methods, which are relevant for educators dealing with students at the cusp of adulthood who might not have sufficient abilities in these areas yet. Algo-heuristic instructional design, cognitive flexibility, and cognitive apprenticeship all align well with the theory and structure of epistemic games and could be useful for informing the development of an educational epistemic game.

Concepts from Enactivism and Complexity Theory

Enactivism, (Varela, Thompson, & Rosch, 1991) as I understand it, attempts a holism grounded in biology, neurology and phenomenology that includes body, mind, consciousness, identity, sociality, situation, environment, experience, and perception as an ecological whole. The mind is not a separate mind but an embodied mind within interactive contexts and situations, and with a history and perceptual tendencies. Enactivism moves beyond constructivism and cognitivism in proposing self-producing (autopoietic) corporeal systems that do not so much construct meaning (as a separate cognitive act or abstract process) as much as evolve (adaptive) identities and worlds (Maturana & Varela, 1992). The evolution of identities and worlds are co-emergent processes of sense-making, cognition, and knowing of itself as embodied experiences within its environment (Davis, Sumara, & Kieren, 1996). Emergence occurs through the act of living (an enacted life) according to its structure, which is constrained by what it is not structurally capable of doing (Davis, Sumara, & Luce-Kapler, 2000; De Jaegher & Di Paolo, 2007; Thompson, 2004; Varela et al., 1991). In a sense, the enactive concepts of autonomy and operational closure⁴ could be used to argue that embodied systems are natural pragmatic systems

⁴ “Autonomous system[s have] ...organizational [static] and operational [dynamic] closure: the result of any process within the system is another process within the system” (Varela cited in

regardless of their level of conscious intention because experience relative to the system is boundary and context specific and the advancement of the organism relative to its structure is the key determinant for action. Enactivist theory and discussion strikes at the heart of many basic ideas relevant to education, science, and research by postulating new definitions and perspectives on what it means to be alive: existential purpose and teleology⁵ (Thompson, 2004); Cartesian dichotomies (such as mind/body, knower/known, subject/object, self/non-self/world); consciousness; and the perceived gaps between science as a positivistic endeavour and being as a qualitative experience. According to Menary (2006) enactivism attempts to bridge (neuro)science and phenomenology, and to reframe the *hard question* of consciousness through alternative integrative perspectives and methodologies. Radical enactivism takes a harder stand against an object-based schema of cognitivistic mental representations of the external world or, said differently, it postulates that “consciousness [cannot] be made intelligible in terms of something else” (p. 48).

Enactivism has many implications for learning theory and education (Davis et al., 2000) and particularly, for my interests, in the concept of individual and social knowledge as an interactive emerging process (enacted emergence of the knowing-knower-known) rather than as an object. The theory also lends itself to new ways of thinking about research methodology from a qualitative and/or phenomenological approach that can simultaneously include scientific empirical quantitative and qualitative interpretive enquiry.

Thompson, 2005, p. 417), such that systemic changes are governed solely by the internal structure and dynamics (rather than external inputs).

⁵ Teleology speaks of a grand narrative by which the purpose of entities and events are perceived. Narratives can be based on any premise but commonly are understood in relation to a divine design or on internally consistent functional design constraints.

Fenwick (2000) says that enactivism “evolved from complexity, ecological, and cybernetics theories” (p. 27), and there are certainly many shared concepts (Davis, 2004). Complexity theory and some of its concepts as they apply to research and analysis were used in this study as a holistic lens to view data and the situations the data was embedded in, as discussed in Chapter 3.

Towards Holism

A thrust that underscores many recent approaches to adult education is a desire to go beyond the simple acquisition of skills and knowledge as a learning experience. They emphasize a more holistic development in the learner of an independent capability (Stephenson, 1994), the capacity for questioning one’s values and assumptions (Argyris & Schön, 1978), and the critical role of the system-environment interface (Emery & Trist, 1965) that considers interactions from the environment side of the equation in which certain processes control interaction variables. My use of the terms holistic education and holistic learning refer not to a specific theory but rather to a general perspective that views the student as a contributing part of a larger whole, in which the student’s connections and boundaries extend multidimensionally into any and all relevant relationships. Relevant relationships would include anything that has an effect large enough to matter or be perceived to matter to stakeholders, including the dimensions of biology and physiology, psychology, environments, ecology, and the social world. In defining the boundaries of holism some authors focus on the bounds of the person only, while others see the relevant boundaries extending to the entire universe (O’Sullivan, Morrell, & O’Connor, 2002).

Holism and the integration of development and learning. Holism is not a well-defined theory or concept. Its origins are sometimes attributed to the work of Smuts (1926). Its roots in education are unclear but it is often associated with alternative education. Miller (1988, 2005)

proposed a holistic curriculum characterized by an integration of domains and perspectives.

Rogers, Mentkowski, and Hart (2006) consider holistic development and its measurement, particularly as it relates to employment competence and curricula. Baumgartner (2001) argues for four adult development categories with the final *integrative* approach being

a holistic view ... focused on how the intersections of mind, body, and sociocultural influences affect development ... Spirituality is also sometimes included in the integrated approach ... promoting students' growth intellectually, physically, emotionally, aesthetically, and spiritually ... [with] Spirituality ... often equated with connection to others and to something larger than oneself. (p. 4)

Holistic perspectives tend to be metaperspectives and imply an interactive connection within a whole as is found in complexity theory and enactivism, and I would categorize those theories as holistic perspectives.

There has been considerable opposition in some circles of academia to holistic perspectives in general, but especially to those that include various alternative theories and/or developmental themes (Chickering & Reisser, 1993). Negative reactions to developmental perspectives seem a bit odd considering childhood level/stage development is for the most part accepted in North American education systems, particularly with respect to structuring stage appropriate learning environments and activities. I suspect opposition to holistic perspectives is partly due to the bias towards scientific rationalism and atomistic reductionism as a — or the — dominant western ideology of knowledge and educational practice. I suspect opposition to developmental themes is also partly a reaction to a perceived association with behaviouristic and radical behaviouristic positions that dominated education in the past. But research results over the last thirty years have clearly shown that people can and do continue to develop cognitively and emotionally throughout their lifetime, even if that lifetime reaches over one hundred (Schaie, 2005). And the nature of this development is different than that of childhood (Hoyer & Rybash,

1994). Adult development has profound implications for the practise, assessment, and analysis of education and outcome results, as well as for employee development, coaching, and counselling to name just a few areas (Hoare, 2006b; Illeris, 2004; Kegan, 1982; Laske, 2006).

In considering the implications of adult development for education, a two-year study of multinational adult learners (Drago-Severson et al., 2001) found that cognitive levels place ontological (meaning making) and epistemological (ways of knowing) boundaries and lenses on learners in every area studied. This included their understanding of their roles as learners, their learning experiences, their social roles, and their expectations of teachers and education in general. In the study, common perspectives were not related to age or nationality, nor highly related to educational level; instead, the best indicator/predictor of the studied outcomes was cognitive level. It is now common to talk about adjusting educational methodology to address diversity in such areas as multiple intelligences, personality styles, race, gender, and age. But the results from Drago-Severson et al.'s (Drago-Severson et al., 2001) research provide evidence that learners' level of metacognition could be as important, and possibly more important, since it sets the limits and direction of understanding and perception, and could inform learning theories such as andragogy/heutagogy, situated cognition, social constructivism, and locus of control/power.

Transformative Learning in Relation to Holistic Education

As an educational objective, transformational development or developmental learning has been around a long time and is significantly related to humanistic objectives, progressive educational perspectives, democratic citizenship needs, and employability gaps (Cranton, 2006; Mezirow, 1990; Rogers, 2001). I find a striking parallel between transformative education and development theories (see Table 7) compared to teaching on spirituality and enlightenment

(Miller, 2005; O'Sullivan et al., 2002; Tisdell, 2006; Wilber, 2000), and compared to many whole person learning theories and holistic learning theories (Miller, 1988; Rogers et al., 2006; Yang, 2004). One major theme that they all share is that the path (of development and learning) is one of increasing complexity and capacity in the respective developmental or learning domains, for example cognitive, emotional, interpersonal, intrapersonal, or mystical.

Table 7: Areas of Focus in Developmental Theories
Moral as per Kohlberg (1981)
Cognitive as per Piaget
Meaning -making + social as per Kegan (1982)
Epistemological as per Perry (1999) and Baxter Magolda (1999; & King, 2004)
Psychosocial as per Erikson (1980) or Vygotsky
Ego as per Loevinger (1976)
Integrated based on gender as per Belenky (1997)
Holistically as per Jarvis (2006)

Another common theme is the function of what Mezirow (2000) referred to as a *disorienting dilemma* that acted as a motivator or trigger for transformative change, especially between developmental phases/stages/levels. The concept parallels Piagetian accommodation that occurs when conflicting experiences or data are not able to be assimilated into the current model/system without accommodation. Mezirow's (2000) model of common phases in the transformational process begins and ends with Piaget's equilibrium. Jarvis' (as cited in Merriam, Caffarella, & Baumgartner, 2007) holistic learning-development model is triggered by what he calls *disjuncture*, where "our unthinking harmony with our world is disturbed" (p. 100). Kegan (1982) describes the same process in cognitive development. Without denying or minimizing that change can occur more gradually and without a discreet trigger, a facilitated transformational curriculum would require specific appropriate cognitive dilemmas to maximize the potential for directed change. For example, Merriam (2007) states that one of the three main goals of the adult learning theory Self Directed Learning (SDL) is transformational learning, and

Kohlberg (1981, 1984) identifies cognitive conflict (arising when moral positions are inadequate to deal with experiences or situations) as the first step in cognitive moral development and suggests it should also be the first step in the process of moral education, as does McAuliffe and Eriksen (2006; 1999).

As mentioned in Chapter 1, the literature review is actually spread out through the first three chapters rather than solely in Chapter 2. This allowed the literature to be referenced to the specific topic without having to continually reference backward or forwards. Therefore, Chapter 3 is primarily a review of the research methodology but there is a fair bit of discussion on the ontological perspective that the research design, implementation, and analysis are based on. Following that, Chapters 4 and 5 present results and analysis, Chapter 6 focuses on implications and Chapter 7 concludes.

Chapter 3 - Methodology

Research Purpose

The purpose of this research is to inform curriculum development of game related programs through an investigation into the perceptions of game developers on expertise within their industry, and on employment readiness of novice game developers. My hypothesis is that a comparison of these perceptions with employability skills research can assist curriculum developers to decide if employability skills research is sufficient for their vocational game program development needs or if additional or alternative research is required. Since employability skills are generic, rather than specific technical job skills, and because of confusion about the meaning of employability skills, a broader more common term was sought. Expertise was chosen and used as the focus for the interview questions; contextualized as what novices commonly lack in order to become successful veteran experts in their jobs and overall in the games industry. The specific context used for the study is the realities of game developers working within the production process who also work with novices and recent graduates. The secondary broader context is the realities of employers and managers in the game industry, and of educators working in related game development programs. The research question is: how do the perceptions of novice and expert characteristics by production team members in the game industry align with the more general research on employability skills and expertise?

Pragmatism as an Analytic Lens

Chapter 3 was previously introduced by stating that it contained a fair bit of discussion on the ontological perspective that the research design, implementation, and analysis are based on. The inclusion of that content was prompted by the suggestion of Creswell and Plano Clark (2007) that the presentation of research would benefit by a section called Philosophical

Assumptions that declares the researcher’s assumptions regarding ontology, epistemology, axiology, methodology, and rhetoric. I consider pragmatism to be a significant philosophical assumption that I hold and therefore, prior to delving into methodology details, this section attempts to make clear some of my assumptions and the effects of such on the research design and analysis.

Creswell and Plano Clark (2007) identify four common worldviews upon which research stances and methods are based: postpositivism, constructivism, advocacy and participatory, and pragmatism. Although there are some fields that are working aggressively at applying pragmatism to research design, methodology, and analysis (Alexander, 2009; Badley, 2003; Beasley-Murray, 1996; Biesta & Burbules, 2003; Giacobbi, 2005; Luck, Jackson, & Usher, 2006; Pansiri, 2005), I find its application and implementation are under-theorized. Pragmatism as a research perspective is most often used simply as a rationale for mixed method research based on the principle of methodology choices rationalized according to outcome effectiveness (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2010). There are some exceptions of course, for instance, Biesta and Burbules (2003), and Morgan (2007) argues for a paradigm shift using pragmatic philosophy that goes deeper than a simple mixing of methods (Table 8).

Table 8: Morgan’s (2007) Pragmatic Alternative to the Key Issues in Social Science Research Methodology (p. 71)			
Research Methodology (p. 71)	Methodological Approach		
	Qualitative	Quantitative	Pragmatic
Connection of theory and data	Induction	Deduction	Abduction
Relationship to research process	Subjectivity	Objectivity	Intersubjectivity
Inference from data	Context	Generality	Transferability

Creswell and Plano Clark (2007) go on to say that research based on a pragmatic paradigm is generally interested in the value and consequences of the research questions and outcomes, and in structuring the research methodology to maximize effectiveness rather than

concerning itself with any a priori organizing principle, thus philosophically aligning with mixed method research. Creswell assigns the following bulleted assumptions to the pragmatic research paradigm/worldview. My comments follow each point. My perspectives presented here have been significantly influenced by Biesta and Burbules (2003).

- Ontology: singular and multiple realities (for example, researchers would test hypotheses and analyze results from multiple perspectives).

Garrison (1999) argues that “Dewey was an organic holist from the beginning. The influence of Darwin eventually led Dewey to embrace an experimental naturalism wherein human nature is perceived as a part of nature. Dewey’s antidualism went very deep” (Para. 16). Based on Garrison a Deweyan pragmatic ontology would arguably favour an organic holistic naturalism. As such, a methodology aligned with it would begin with an organic holistic (unitarian rather than dichotomous) bias that considers complex interactions as experimental variables within a situation that is perceived as part of a continuum of experience. In agreement with this view, Biesta and Burbules (2003) see pragmatic practice as not separating thought and action, theory and practice, research and practice, instruments and values, techniques and purposes, means and ends, nor the possible from the desirable. The relevance of this bias is strongest for the initial approach to the design and the analysis of the methodology, since the actual methodology chosen is fully dependent on the objectives, practical constraints, and context of the ongoing process or exploration.

- Epistemology: practicality (for example, researchers collect data by *what works* to address the research question).

A Deweyan pragmatic epistemology, as presented in Figure 1, parallels the scientific method in spirit and basic structure and embraces both formal research and informal

research. But the knowledge constructed by research is not a knowledge of reality but of conditions and consequences (Biesta & Burbules, 2003). As I see it, the key points are that 1) knowledge is fallible, 2) that reality cannot be intellectually comprehended as a 1:1 correspondence but is experienced (by an embodied mind and a complex system of minds in a community) in a unitary continuum, 3) that awareness of perception within the unitary continuum is necessary for pragmatic practice and understanding and 4) awareness of perception is an important part of quality reflective practice. As these points apply to the analysis of research data, hypotheses are explored and knowledge claims constructed based on an interpretation of the situation's meaning which arises from the interactions of the internal with the objective (Dewey, 1998). Pragmatic perspectives (see Figure 1) also consider knowledge and action to be inseparable. Knowledge is not just gained through action, but the two are integrated. Schön's (1983, 1995) tacit knowledge-in-action parallels this concept. The tacit aspect includes intuitive, corporeal, heuristic, felt, etc., and implies that epistemologically actions would be considered to be integrated in knowledge construction and expression. Further, pragmatic epistemology considers knowledge to be a fallible instrument that is derived from consensus and agreements within a community.

- Axiology (the researcher's value biases): multiple stances (for example, researchers consciously include their own biased perspectives as well as external perspectives).

According to Biesta and Burbules (2003), a pragmatic perspective does not separate the possible from the desirable in the context of the community of enquiry⁶; therefore, determining whether what we desire is doable cannot be divorced from whether what is doable is also desirable. And what is desirable cannot be left to relativism or absolutism but a

⁶ A group that agree on a common goal and on the pragmatic process (experimental, incremental, cumulative action) applied to reaching that goal.

“thoroughly social or intersubjective humanism – a humanism in which we are fully human only in and through our cooperation, communication, and common, democratic deliberation with others” (p. 106). Considering the collapsing of an ends-means duality means the duality is a functional distinction only, as two sides of a coin, and therefore pragmatism can also be used to justify means as ends in themselves. Together these ideas imply that the process itself should ideally facilitate and promote cooperation, communication, and common democratic deliberation among the participants in the research, and should align with collaborative research methods such as Action Research and Appreciative Inquiry that explicitly embrace these principles.

- Methodology: combining (mixed methods).

As I see it, pragmatism provides a position from which to defend any method that is the best that can be imagined and implemented. It also favours methods that practice participatory democratic empowerment. The pragmatic method itself parallels the scientific method as an iterative process of reflection on experiential evidence, hypothesis, experiential experiment/test, evaluation, add to evidence, and start over. Brendel (cited in Alexander, 2009) proposes the principles of pragmatic research as 4Ps: Practical, Pluralistic, Participatory, and Provisional:

- (1) A practical need arises when a problematic situation triggers the need for a community of enquiry, who then (2) use a scientific attitude, for example an empirical experimental process to define and solve the problem. The process is shaped by real world experiences of the (3) participatory democracy within the community or greater collective.
- Pluralistic multiple approaches to solve a problem.

- Participatory democracy that considers the experience of members and works collaboratively to find the best overall solution.
- Provisional: situations and people, and therefore solutions, all change.
- Rhetoric: formal and/or informal styles of writing.

If the pragmatic value of knowledge is based on effect, the clearly understood dissemination of knowledge to the extended community that will be affected is a critical step. A principle that might express the spirit of pragmatic rhetoric is that the meaning of the message is not what is intended but the response it triggers.⁷

Figure 1 diagrams my understanding of three related models from Dewey's *Experience and Education* (1963) that tie the principles of a scientific method of research to a pragmatic life process for individuals and communities. The top diagram illustrates the overall iterative process that includes five nonlinear aspects of the thinking process, each of which integrates with a person's *experience* and *experimentation*, or as the middle diagram illustrates, the nonlinear steps of reflective thinking integrate with and co-create active experimentation through intelligent action and concrete experience. Concrete experiences (as well as subjective perceptual experiences) are simultaneously both outcomes of the process and further inputs to the ongoing iterative process. This is a complex and holistic model of thinking that includes a concept of embodied mind in interaction with corporeal reality (bottom diagram). Experience is further elaborated in the bottom diagram illustrating the experience of an embodied mind in the context of its relationship to its environment (as a relevant holism) in which experience is triggered by situations that arise from the interaction of the embodied mind with the external world.

⁷ Found in many fields, for instance Neuro-Linguistic Programming (NLP).

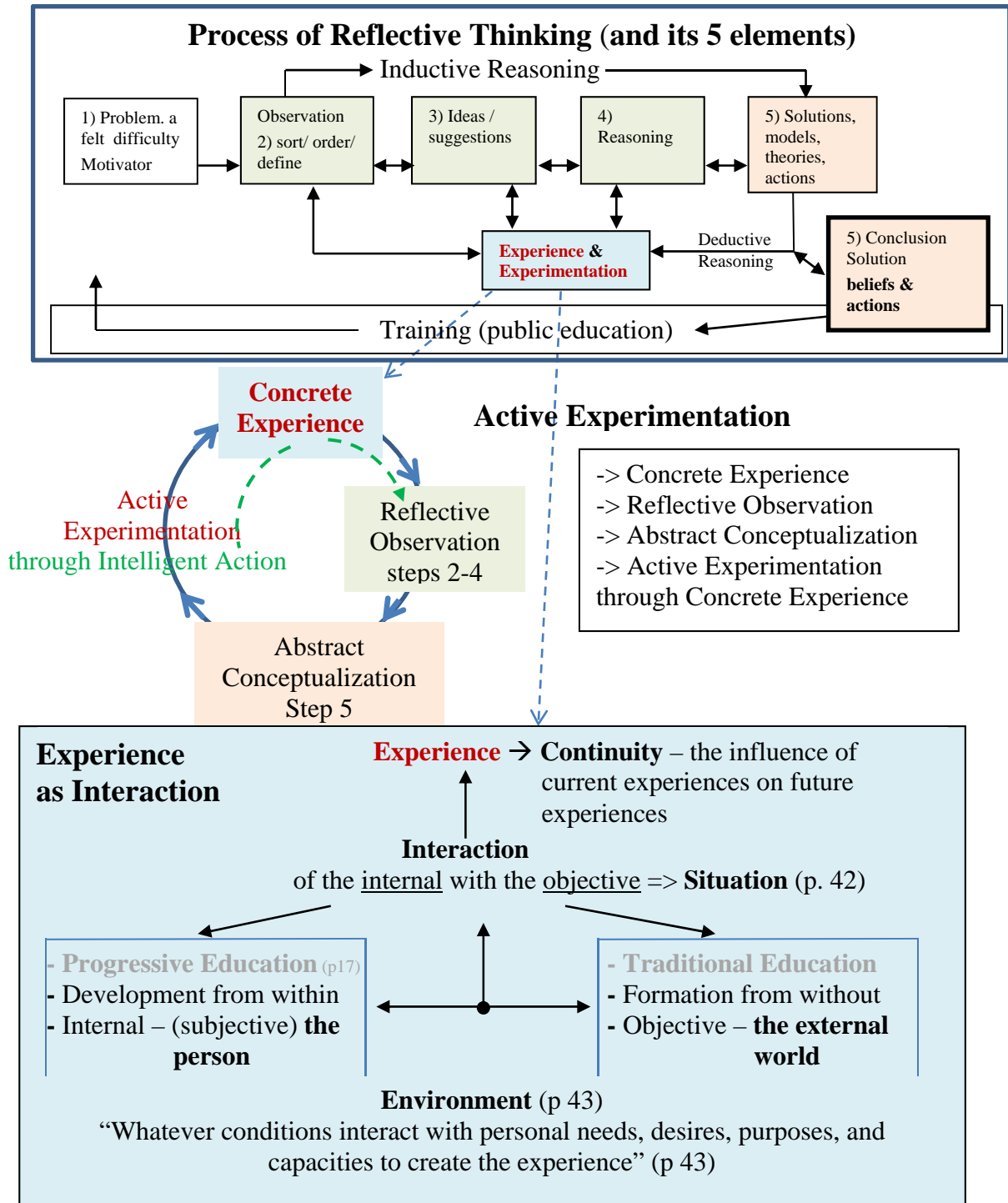
Deweyan pragmatic ontology and epistemology can embrace an absolute or essential truth as a fallible instrument, but functionally would view absolute truth as an absurdity for a finite mind to know or proclaim. Humans learn through reflection on their limited individual and collective experiences and that leads to hypotheses that are tested by ongoing experiences and trial and error in ongoing iterative processes. Humans can learn through the experience of others but all hypotheses must still be tested by personal and community experience. Dewey distinguishes educative experience as particularly important to the process. Educative experiences require reflection on the logic and evidence of the conclusions and judgments arising from the experience (experience as per Dewey in terms of the interaction between the person and the concrete/external world), and openness to change if conclusions are not effective or if they conflict with experience.

I am ontologically and epistemologically aligned with this view and therefore approach my data and analysis through this lens. The focus is on perceived common practical problems, objectives, and solutions, and how a person's epistemology might function to support or hinder the attainment of their perceived objectives. I say perceived objectives because there may be unperceived or unconscious objectives. Research participants may also have perceived objectives that they don't disclose or that I can't discern and these possibilities need to be considered when evaluating the data. My epistemological assumption is that I arrive at what I perceive to know through the pragmatic process; both consciously through reflective thinking and knowing in action, and unconsciously through empirical thinking (as per Dewey). I have unaware assumptions and look for those when evaluating my beliefs and judgments. I experience the world and use various natural heuristics to reach potential conclusions, but I look to the

experience and evidence and conclusions of others (knowledge as socially constructed) to support or contradict my position.

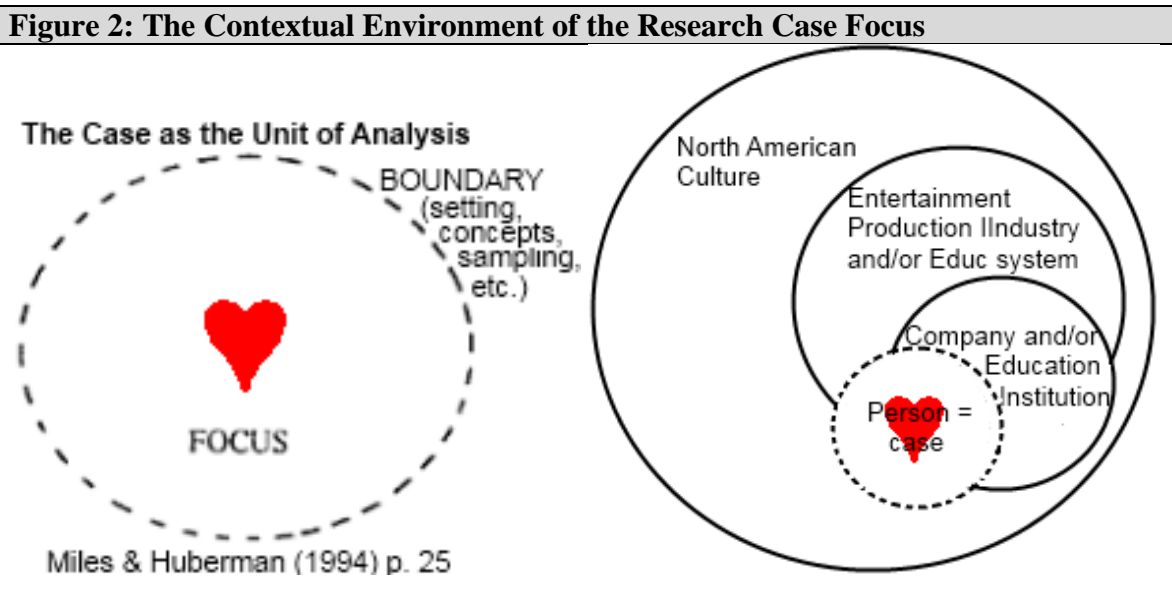
Pragmatically it makes sense to approach a research focus from a number of different perspectives and it would be expected that associational heuristics will trigger additional insights into the focus. Therefore, I asked interviewees to think about expertise and gaps from very different perspectives, for example characteristics of expertise, novice gaps, causes of gaps, different groups' perspectives on ideal employees, personal expertise mastery, and situations in which gaps are evident. When considering situations, it seemed to be easier for interviewees to recall situations when they were asked to conceptualize simulations rather than when they were just asked to identify situations. It was also common for interviewees to bring up points about gaps or expertise while explaining other topics that they hadn't previously associated with expertise or gaps. A number of interviewees mentioned that it was interesting for them to talk about these things because they had never really worked through their thoughts and beliefs in these areas. Through explaining they discovered what they knew and believed. Holistically, an awareness of feelings and emotions and the needs that are associated with them is important for a detailed description of the situation. Therefore, in the interview process and analysis I also looked for clues to feelings and emotions regarding events/situations.

Figure 1: Dewey's (1963) Models of Reflective Thinking, Active Experimentation Through Intelligent Action, and Experience as Interaction Within an Environment & Situation



Methodology: Multiple Case Studies

In terms of scope, Yin (2009) characterizes the logic of a case study design as being empirical investigations of a “contemporary phenomenon in depth and within its real-life context” (p. 18) as opposed to a laboratory experiment, and where the object of study and the context are blurred. Miles and Huberman (1994) see the boundaries of a case study as somewhat blurry and portray it graphically with a heart in the centre of a circle, with the heart representing the focus of the study and the circle representing what they term a bounded context.



In this sense my research focus (and the primary phenomenon studied) is the perception of expertise and gaps by relevant individuals (game developers first and educators second), with case boundaries (and units of analysis) being the individuals. Multiple individuals become multiple cases and the perception of gaps can be compared across cases. Because the individuals also belong to common categories such as companies and institutions, and in a larger context their industry and North America, the focus applies across cases and to a lesser degree within larger contexts as well (Figure 2). The perceptions of expertise (as the research focus) include a

continuum from expert foundations prior to entry into the field, to novice acquisition of foundational characteristics for success, to the full development of what are perceived as the core characteristics that define veteran expertise in the field.

Merriam's (1998) case study model was used as the design basis. According to Merriam "one of the assumptions underlying qualitative research is that [social] reality is holistic, multidimensional, and ever-changing; it is not a single, fixed, objective phenomenon waiting to be discovered" (p. 202). As a subset of qualitative research Merriam defines a case study as "an intensive, holistic description and analysis of a single, bounded unit" (p. 193). The holistic perspective has been considered a general feature of all qualitative research (Bogdan & Biklen, 2007) and it is of particular importance and resonance to my research methodology and theoretical lens. But because of the potential size that a holistic scope can escalate into, one of the values and necessities of conceptualizing and planning research within a case schema is that the case boundary can and must be confined to what is reasonably manageable for the researcher, such that the researcher is able to achieve an in-depth data collection and analysis. Large studies and quantitative findings that would attempt to prove a general theory for an entire industry or larger unit would not address my research objectives as I am not trying to prove a general theory but rather to understand a specific situation in depth, in the context of lived experience, and for practical value to the communities that I associate with.

The heart or focus of the research is the perceptions of expertise and gaps of novice game developers by the people for whom this matters, primarily the people that are, and work with, experts and novices, but also those that have responsibility for educating and training for the industry, as well as the novices themselves. From the perspective of complexity theory, even if an entire industry shared common epistemic and ontological perspectives, the actual contexts

and scenarios of each organization will be unique, for example arising out of varying group norms, workflows, and power dynamics. As well, subgroup contexts even within a single company would typically vary. To investigate enough organizations to establish confidence in what those commonalities are and what scenarios adequately address them is not reasonably manageable, in addition to being well beyond the scope of my current research context. And, as is the common wisdom in simulation development (Aldrich, 2005; Kevin, 2002; Quinn, 2005), understanding a context of social reality sufficiently to create specific simulations that are epistemically and experientially knowable and relevant requires in-depth holistic case studies. Therefore, my research design is to explore a sufficient number of relevant case studies with enough depth to meet the practical needs of curriculum design, as well as having some breadth with cross-company validity comparisons, while still being able to contribute to cumulative data on the subject. I would be pleased if the results of this project also someday contributed to causal-comparative research in related areas.

Sample Selection and Demographics

A combination of stratified purposive sampling and snowball sampling was used in securing interviewees. Purposive sampling (non-random selection based on experience in the area of the research question) is congruent with the qualitative research intentions to explore specific situations and the stratified qualifier refers to delineation of subgroups that allow comparisons (Creswell, 1998). Production workers from the game development industry and closely related fields, who were currently working in the industry or who had been working in the industry within the past year were the primary recruitment focus. Faculty and curriculum developers from educational programs with a vocational game development outcome were the secondary focus. As much as possible samples were selected to “maximize access to the

phenomenon” (Richards & Morse, 2007, p. 231) with the clearest most relevant views. A number of interviewees had recommendations of ideal candidates and voluntarily made introductions that resulted in additional interviews (snowball sampling).

Demographic data is presented in Table 9-12. A majority of cases were from Vancouver but Skype was used as an alternative to face-to-face interviews so that geographical location was not a major obstacle. Fortunately Vancouver is a particularly ideal location since it is home to a large number of game companies and vocational programs. Although it was not possible to fully control the sample demographics, the design intention was to recruit 20–30 cases that included people from small companies or independent contractors, medium size companies (up to 150–300 people), and large companies of at least 500 employees. Twenty-three recorded audio interviews were completed, in addition to two online surveys and two paper surveys. The online and paper surveys used the questions from the interview guide (Appendix 5).

Because the primary focus of the research is on perceptions of game industry professionals, only a few educational interviews were sought for reference and comparison. There was also less need for the educational perspective because there have been an increasing number of very recent research projects from the educational perspective, and many individuals from industry also worked for educational institutions. I specifically solicited interviews with a few key people in the educational research area. One is a principal researcher in the area of game development curriculum whose significant amount of consolidated research from the educational perspective informs my data. Another interview was with a leader in game development education research who has headed up numerous seminars on the topic with top educational institutions in the field, has been involved in the authoring of the IGDA curriculum development document (which is considered one of the premiere authoritative references on game curricula

Table 9: Demographics: Age, Gender, Country					
Age range	#	Country	#	Participants	#
61+	2	Canada	21	Interviews	23
51+60	1	US	4	Online Survey	2
41-50	6	Unassigned	2	Paper Survey	2
31-40	12	Gender		Total	27
26-30	5	Male	20		
Unassigned	1	Female	7		

Table 10: Demographics: Expertise					
Game Development Area of Expertise		Professional Experience		Self-Described level of Expertise	
Art	12	16+ years	2	Experienced Game Industry professional	15
Production Management	5	10 -15 years	9	Novice Professional	2
Technology	3	5-9 years	7	Intermediate Level of Professional Experience	5
Game Design	2	2-4 years	6	Unassigned	1
Audio,	1	NA	3	NA	4
Senior Management	1				
Software Engineering, Programming		1			
Other	2				

Table 11: Demographics: Education							
Attended (a game related program)		Academic Level achieved		Year Graduated		Academic Involvement	
		PhD or equivalent	5	> 2010	1	Instructor, mentor, advisor to a game related program	8
		Master or equivalent	2	2006-2010	6		
yes	9	Bachelor or equivalent	11	2000-2005	5	Manager, administrator, curriculum developer for a game related program	10
no	18	Diploma or equivalent	6	1990-1999	8		
		Certificate or equivalent	1	1970-1979	2		
NA	1	NA	2	NA	2		
				Unassigned	3	NA	9

and is a collaboration of top educational players), and has been a key implementer in a university degree program in the area of game development. In addition, I have a significant amount of personal experience and exposure to game development from the private education sector. In the end, seven full-time educators were recruited. Of the full-time educators three were from public universities with bachelor or master level programs related to games, one from a private

Table 12: Demographics: Company									
Local Company Size		Parent Company size		Company Type		Company Type Previous		Development Platform	
>500	12	>500	10	Developer & Publisher	9	Developer & Publisher	2	All or most	1
51-200	7	51-200	0	Major Developer	1	Publisher	1	Console and Arcade	3
1-50	4	1-50	0	Independent	9	Major Developer	1	PC	1
NA - (contractor)	1			University	4	Multi- Company types	3		
				College	4				
				Other	0				
NA	4	NA	17	NA	0	NA	8	NA	9
						Unassigned	1		

university with a bachelor degree, one from a private college with a one-year game and animation program, and two from a private college with a two-year diploma. The private college educators all had professional production experience in games or film and TV. Fifteen of the non-full-time educators were also teachers and advisors and/or curriculum developers.

In the dissertation, interviewees are given pseudonyms to preserve anonymity. Table 13b provides background information on each interviewee and Table 13a provides the meanings for the codes used. Appendix 6 has more complete information about each interviewee. Throughout the dissertation quotes by, and references to, the interviewee use the pseudonym first name in order to clearly distinguish them from literature citations. Because of the use of NVivo (see the section on Data collection and coding for an explanation of NVivo and how it was used) audio recordings were referenced directly and therefore direct quotes are cited with the pseudonym followed by a time reference based on the approximate start time of the quote in the NVivo audio file.⁸ The format used is minutes:seconds when the quote occurred within the first hour of the interview, and hours:minutes:seconds when the time started after an hour had passed. For

⁸ Audio files are stored with the other research materials in the office of Don Krug.

example, 18:12 would indicate the quote began approximately 18 minutes and 12 seconds into the interview, and 1:25:10 would indicate the quote began around 1 hour, twenty five minutes, and 10 seconds into the interview.

Table 13a and 13b: Interviewee Pseudonyms and Background Information					
13a: Code Meanings for Table 13b					
Col = Column		Co = Code		Col = Column	
Co = Code		Col = Column		Co = Code	
Col	Co	Meaning	Col	Co	Meaning
B	f2f	Face to Face	(all)	NA	Not Applicable
	Sk	Skype	(all)	un	Unassigned
	Srv	Survey	(all)	O	Other
D	Type of Educator means the type of academic involvement they have				
	1	Instructor, mentor, or advisor to an academic game development program			
	2	Manager, administrator, or curriculum developer for a game development program			
H	Area means Area of Expertise		L	Type of company Currently working at	
	Art	Art		1	Developer and Publisher
	PM	Production Management		2	University
	Tec	Technology		3	Independent
	Gde	Game Design		4	College
	Au	Audio		5	Major Developer
	SM	Senior Management	O	Type of company Previously worked at	
	SE	Software Engineering, Programming		1	Multi company types
I	Industry Experience			2	Publisher
	1	16+ years in industry		3	Major Developer
	2	10 -15 years		4	Developer and Publisher
	3	5-9 years		5	Other Industry
	4	2-4 years			

Quotation marks are used in this dissertation (particularly in chapters 4 -6) to identify specific words used by interviewees without intending to quote a specific person. For instance, at the beginning of Chapter 4 on p. 68 the words *thick skinned* are set off by quotes meaning that those words, or nearly identical ones, were used by interviewees, but there is no reference or page number because it is not intended to quote anyone, just identify the types of words used.

Table 13b: Interviewee Pseudonyms and Background Information							
A	B	C	D	H	I	L	O
Interview		Pseudonym	Type of Educator	Area	Industry Experience	Type of company:	
Date	Type					Current	Previous
8/18/10	f2f	Gandalf	1	Art	2	1	5
8/20/10	f2f	Charles Kane	2	GDe	NA	2	NA
8/23/10	f2f	Jacqueline Natla	1	Aud	1	3	1
8/23/10	f2f	Sophia Leigh	NA	Art	4	1	NA
8/24/10	f2f	Amanda Evert	2	GDe	2	3	1
8/25/10	f2f	Janice	NA	Art	4	1	NA
8/26/10	f2f	Laura	1	Art	3	3	5
8/27/10	f2f	Jerome Johnson	NA	Art	4	3	NA
8/31/10	Sk	Kristina Boaz	NA	PM	3	3	NA
9/07/10, 10/05/10	f2f	Margot Carvier	2	Art	2	3	NA
9/02/10	f2f	Anaya Imanu	1	Art	2	1	5
9/02/10	f2f	Marco Bartoli	1	Art	3	1	NA
9/07/10	Sk	Alister Fletcher	NA	PM	2	3	1
9/15/10	f2f	Gianni Bartol	2	Art	1	4	5
9/20/10	f2f	Larson Conway	NA	O	4	1	5
9/25/10	f2f	Werner Von Croy	NA	PM	2	5	2
10/04/10	f2f	Amelia Croft	NA	PM	3	3	5
10/05/10	Sk	Chan Barkhang	1	Tec	4	1	5
10/07/10	f2f	Totec	1	SM	2	3	3
10/11/10	f2f	Pierre Dupont	NA	Tec	2	1	5
10/15/10	Sk	Patrick Dunstan	2	PM	NA	2	5
10/20/10	Sk	Yarofev	2	SE	NA	2	5
10/27/10	Sk	Qualopec	2	Tec	2	1	5
Jul-10	Srv	Jean-Yve	2	O	4	2	NA
Jul-10	Srv	Semerkhe	1	Art	3	4	un
Jul-10	Srv	Tony	2	Art	3	4	4
Jul-10	Srv	Puna	2	Art	3	4	4

Interview and Coding Process

The primary instrument for data collection was an interview guide (Appendix 5) that focused on four primary interview questions designed to solicit the main data for analysis. Other secondary and tertiary questions were included in the guide, including demographic information

that was considered potentially relevant. The four primary questions are labelled (P) below. The Secondary and tertiary interview questions are labelled (S) and (T) respectively. The primary question topics are Negative Characteristics, Causes of Negative Characteristics (with a secondary question regarding example situations where negative characteristics commonly present themselves), Ideal Characteristics, and Expert Characteristics.

- (P) What are 3-5 top contenders for common key *negative characteristics* or behaviours of novices that they have to overcome to be successful in the industry?
- (P) What is your best guess at the *causes* of negative characteristics?
- (S) What are the most common *situations* in which negative characteristics or behaviours become most evident and/or where competencies are most needed but missing (gaps), and/or key scenarios that employers wish new employees could deal with effectively?
- (P) What would be the common and *ideal* ways that novices could/should handle these situations?
- (S) What characteristics of an *ideal employee* would management and production see as different or the same?
- (P) What are 3-5 top contenders for common *key characteristics* of *successful veteran experts*?
- (T) Which characteristics of expertise have you *mastered* and which are you still working on?

Additional secondary (S) and tertiary (T) questions were:

- (S) Is there an identifiable culture unique to the game industry? If so, describe it.

Questions to stimulate reflection on industry education and training:

- (T) Is there value in a program paralleling the industry culture (or expectations) and why?
- (T) Why do you think game development programs have the right or wrong balance between technical and higher-level thinking and soft skills?
- (T) Advice, suggestions, beliefs for education. How can educators improve the preparation of graduates?
- (T) Any final comments or questions?

Questions about curriculum objectives and outcomes for game related programs:

- (S) Q1: Summarize the general educational philosophy and methodology of the educational institution you are/were involved in. Q3: Summarize the general educational philosophy and methodology of the game development program (or related program). Q2 & Q4: Rate your level of clarity (on a six point Likert scale).
- (S) Q5: Summarize the program educational objectives and outcomes. Q6: Rate your level of clarity (on a six point Likert scale).
- (S) Q7: What methods does your institution use to ensure the program outcomes are relevant, necessary, complete and sufficient? Q8: Rate your level of confidence that the outcomes are relevant, necessary, complete and sufficient (on a six point Likert scale).
- (T) Any final comments or questions?

Data collection and coding. Two interview guides were created, one for industry and one for education, along with a separate demographics page. For some interviews both guides were used since the interviewees were involved in industry and education. The guide (with questions) was printed out and notes were taken directly on the guide during and after the

interview. Along with other information, including the consent letter, the interview questions were published to a website (<http://ubc1.shawwebspaces.ca>) as well as an online survey (<http://www.surveymonkey.com/s/ubc1>).

1. Data from the online surveys, paper surveys, and recorded audio interviews that were conducted in-person and via Skype were used. The website and online survey attracted only four respondents and that data was included in the analysis. There were only two paper surveys submitted.
2. Interview meetings were collaboratively arranged with the interviewees according to their convenience and comfort, and were conducted in locations of their choice or online via Skype from wherever they chose. Interviews were scheduled for a minimum of one hour and up to two hours. But most interviews went well over two hours.
3. During the interview I would repeat back what I thought the person was saying, particularly after long complex multi-threaded or layered ideas, to check whether I was accurate in following their thinking.
4. After each interview the recordings were reviewed and noise reduction or other processing was applied if necessary to ready them for importing into NVivo 9.⁹ NVivo technology allows coding of the audio directly so that textual references can become just that—references—rather than the source itself. NVivo 9 is designed to be used in this way. Audio and text are linked and can both be recalled almost instantly together.
5. In NVivo I coded each idea as thoroughly as I could directly from and within the recording.

⁹ A common methodology of inductive Case Study analysis, as per Yin, is to fully transcribe all audio recordings. Word counts are often used to search out themes and major concepts. That methodology makes sense in a text based paradigm necessitated by the technology available but the newer technology of the NVivo 9 system was deemed superior for audio recordings.

6. In order to remember the context and specifics of the coded audio, I either transcribed the coded audio completely or paraphrased the ideas that were coded and checked them with my notes.¹⁰
7. Because I had done all the interviews myself, had taken notes and reviewed the notes afterwards, and had in many cases listened to the recordings additional times before and during the time I was prepping them for NVivo, I was very familiar with all the recordings and the themes and ideas that were being expressed. Nevertheless, other than the actual core interview questions and a few core basic themes that were explicitly repeated by a number of interviewees—for example, collaboration and crunch—I didn't create coding categories in advance. Instead I used NVivo to carefully listen to each interview and created descriptive nodes (NVivo term for a code category) for each idea as it came up, then renamed, broadened, narrowed, deleted, combined and collapsed nodes as I systematically went through each interview. This process sometimes took up to four days to complete for a single interview.
8. Once that process was done I started a general analysis of all the nodes, looking for common themes or other ideas. I revisited literature on relevant topics and explored additional literature that might help me to understand the perceptions of the interviewees and the situation or environment, and I questioned the data from many perspectives including pragmatic based questions and complexity theory questions.
9. As I began writing on the themes and ideas being presented and relating them to the literature and my own experience, I went back to the recordings to ensure I was

¹⁰ Audio was imported as the primary source and within NVivo I linked transcribed or paraphrased sections as reference to the audio sections. But because this dissertation is being written in a text based paradigm and the instant-access multimedia paradigm is still only in its infancy, I ended up still having to transcribe a large portion of the audio.

summarizing or quoting the interviewees directly from their perspective, particularly if I hadn't previously fully transcribed a section.

10. After I felt that I had exhausted the coding of raw data in NVivo I started a new analysis process by exporting from NVivo all references related to each interview question.
11. The references for each question were categorized and coded from scratch using only internal references and not based on the previous NVivo nodes. Obviously I was aware of the NVivo nodes (coded themes) and this helped to make decisions regarding identification of themes and concepts, grouping, labelling, condensing, combining or separating words to use. Excel and Word were used for this process.
12. After categories for a question were reasonably solidified I counted the number of references in each category and began ranking the categories by the number of references and percentages. The counts helped me to make decisions regarding separating, collapsing, or combining categories and creating subcategories.
13. Categories were never considered to be final or closed but instead the coding and categorization process continued as an iterative process as each question was analyzed. The original audio sources were consistently referenced in the iterative process as described previously. The last iteration of categories for the primary interview questions, along with the key references they intend to describe, are included in Appendix 3.

Analysis

Coding of the audio interviews was based on Ritchie and Lewis's (2003) model:

1. Categorizing (organization and grouping)
 - a. Defining characteristics of perceptions (relevant, exclusive, sufficient, necessary)
2. Coding (taxonomic analysis) by:

- a. Contextual coding: describing the form and nature of perceptions
- b. Explanatory coding: describing reasons for perceptions
- c. Evaluative coding: assessing effectiveness of perceptions
- d. Generative coding: hypothesizing; proposing theories, strategies, and actions

Because a primary purpose is to inform a curriculum relevant to the case, and not to build a substantive theory, analysis followed a Constant Comparative Method (Merriam, 1998), which considered the data up to the Explanatory coding of the model (Coding taxonomy 2b above).

Explanation of how and why specific perceptions about expertise and gaps exist was considered necessary for informing a curriculum that seeks to provide an adequate foundation for the acquisition of expertise and reduce or eliminate gaps. Although some theorizing and hypothesizing did occur, there was no attempt to experimentally prove or disprove hypotheses. Quantitative data were not used as statistical evidence, instead, reference counts per category were used to aid in decisions to collapse categories or change the descriptive labels. When categories solidified, the counts provided a percentage ranking and a rationale for hierarchical ordering. Counts and percentages are included in some tables based on whether or not they were deemed to have potential informative value, but again, not for statistical validation purposes.

One primary reason that the counts cannot be used statistically is that there are too few samples and far too much subjectivity and sources of error. For example, one verbose person might mention a characteristic numerous times in various contexts while another less verbose person might mention a characteristic only once. Since all instances of the idea were counted, the results will be skewed. This can also be a problem with the methodology of using transcription word counts in small samples and is one reason I abandoned that methodology after some experimentation. I paid attention to this issue and cross-checked references per case to add some

small level of validation for the hierarchies. The top categories were clearly not founded on verbosity skews, but the lower ranking categories were far more susceptible. This method was used for all questions with experimental variations tried within the iterative process and included in the process if they were valuable for understanding perspectives or increasing confidence in the coding labels or reference grouping.

Generalizability and Validity

The intention of this research does not include the development of a general theory nor generalizing to larger populations. Instead the intention is to inform curriculum development for maximizing effectiveness of educational programs. Therefore, there is no attempt to defend empirical generalizability, nor external validity of the research or analysis. But to improve the potential that the data and analysis aligns with the intended research questions being examined, multiple cases (23 audio interviews and 4 surveys) and multiple sources of data (for instance, the IGDA listserv and similar published research) were used. In addition, the vast amount of validated employability skills research can be considered an external standard and this factored in to the decision to use it as a comparison source. Regarding the small sample size of cases, “a single case or small non-random sample is selected precisely *because* the researcher wishes to understand the particular in depth, not to find out what is generally true of the many” (Merriam, 1998, p. 208). Merriam also argues that qualitative studies must provide enough detail for the reader to determine whether the conclusion makes sense, contain what she calls a thick-description that is sufficient enough for the reader to assess if generalizations may be relevant or generalizable to their situation. These principles guided this research, analysis, and presentation.

The research design did not use triangulation in the strict sense but did use what has been described as qualitative methods triangulation (in this case survey and interview), triangulation

of sources (previous studies), and theory triangulation (complexity and pragmatism) to improve research rigor and confidence in the analysis and conclusions (Ritchie & Lewis, 2003). As well, I accounted for my own presence as a research instrument (Creswell, 1998) and consciously attempted to apply a reflective holistic perspective to the process. My perspective includes a generally pragmatic philosophical position combined with many years of personal experience in relevant educational and industry relationships, projects, events, and discussions with game developers.

Non-statistical qualitative quantities. The exploratory case study research design uses all of the information available to arrive at hypotheses for further testing. Reference counting was used extensively for a number of purposes that included assisting in making decisions regarding category creation, providing some evidence for a hierarchical placement of concepts (on the assumption that it would be more informative to order the concepts than not), and as an instrument for making comparisons and triggering more questions. As is mentioned in the presentation of the results in Chapter 4, the top categories were unambiguous in terms of the significantly greater number of references that clearly described the same or closely related concepts. The categorical name was then chosen to descriptively reflect the concepts as accurately as possible. It is reasonable to assume that descriptive category names could be improved, but it is important to keep in mind that first and second stage coding was not based on fitting references into categories but on defining categories based on grouping of like references. The large categories remained fairly unambiguous regarding the fit between reference concepts, but collapsing smaller categories into the larger or into new categories required some broadening and generalizing and re-describing that introduced increased probability of inaccuracy or unrepresentativeness. In addition, because many responses contained numerous interrelated or

integrated concepts, coding included both separating out and counting discrete concepts, as well as considering how to represent integrated concepts as a whole, especially for expert characteristics where multiple integrated concepts were more prevalent. Qualitative judgments are necessary and expected for this aspect of the categorization and coding process and form part of the conclusions of the research. That part of the research is unique to the qualitative analysis and not replicable. Nor is that part of the research able to be validated. Instead, what can be validated are the resulting categories that can be tested through a sufficient sample of the industry or by hypotheses testing research.

As an iterative process the coding can always be improved (more reliable, more generalizable, more valid, more representative). But the goal in exploratory qualitative research is not proof but relationships and reasonably sufficient evidence to warrant further research, in this case the accuracy and completeness of the categories and of the coding. The counts and percentages, therefore, are quantitative representation of the qualitative information used as comparison instruments and supplementary data in considering conclusions. They are in no way considered nor used as statistically valid or accurate. Analytical conclusions in the form of representative categories can be carried forward into further research that could include quantitative data. For instance, the next step in the original research plan was to send the summary results to the interviewees and then to a larger sample of the industry for evidence of validation. Prior to that, a review and triangulation of the categorizing and coding using two or more additional coders, could increase confidence of the categories but would not be sufficient to validate them, nor would it be necessary for further research, and for this research project it is not considered necessary to triangulate the coding since the counts and percentages are not

statistical anyway, nor are they used to back validity or generalizability claims, but rather are only evidentiary.

Chapter 4 – Results

As presented in Chapter 3, there were four primary interview/survey questions directly targeted to the research focus. For the purposes of relevancy, manageability, and alignment with the chosen methodology and ontology, the presentation of results in this chapter focus on the integrated results and analysis from the four primary interview/survey questions rather than all of the data from the interviews and surveys. The results from each of the four questions are presented sequentially and the analysis for each question includes supplemental secondary and tertiary data when relevant to the results. Supplemental data were considered throughout the analysis but some material was considered important enough to require inclusion in separate sections under one of the main question headings. Some of the larger analysis topics are also presented as separate sections.

Interview Question #1: Perceived Negative Characteristics

Through the coding process some concepts were clearly evident in repeated terms, for instance the word “collaboration” and the need to “collaborate” came up significantly more often than others, as did the lack of ability and need to be “thick skinned” in order to take criticism effectively and not personally. Although the need to be able to take criticism is easily arguable as a skill required to collaborate I tried to stick with the interviewee definitions and examples and not to collapse categories that had more than four references unless I could find no significant informational value to them being kept in separate categories. Other ideas were not as clear and easy and I will discuss some of the issues in creating the categories presented in Table 14.

Table 14: Common Negative Novice Characteristics						
Negative Characteristics		Indicators to perception: behaviours, decisions, language, perspectives				
Note: cp - Poor Communication has a subcategory % & a category %. The number of references is followed by the %						
Poor Communication (49)(42%) [(cp) = (10) (9%)]		not communicating at all, not communicating negative news, not telling the truth, avoiding discovery of issues...				
misFit (Primarily due to poor interpersonal/social behaviours) [cf] (9)(8%)		Fit = productive rapport, befriend, clear productive friendly conversation, not too shy or too arrogant. the misFit category included Fit references without specifics as well as general references to lack of interpersonal and social skills that led to some level of alienation from the team, e.g., lack of social etiquette, unable to develop rapport, value & style clashes.				
Superiority Entitlement Ego Myopic [ce] (9)(8%)		cocky, brags, opinionated, promises with confidence not based on proven results. Expects: treatment beyond what is earned; success without hard work; to be catered to. Gets personally attached to work, proclaims being right or best and tells others they are wrong or inferior, persists in arguing or proclaiming personal perspective against the team				
Non-Collaborative [cc] (9)(8%)		Unaware/uncaring of impact on team or company (e.g., miss deliverables, distracted or distracting, goes own way & doesn't follow procedures or standards), negative to undesirable jobs (lack patience & paying dues), doesn't ask for help or show work early and often, doesn't show appreciation or support team goals and people, reacts negatively if their interests are not privileged, unwilling to go above and beyond, doesn't talk or communicate well across disciplines (or areas), quitting midstream (mercenary, not loyal), competitive win-lose behaviours				
Defensive [cd] (7)(6%)		reacts to feedback & criticism with negative or resistive verbal and/or body language, refuses to consider alternatives or negotiate, doesn't take directions, gets emotional				
Antisocial [ca] (3)(3%)		talk out of turn, in your face, argues, being right, divisive, disrespectful, non-objective, unprofessional (emotional non-objective attacks), disrespectful actions				
Non-Accountable [cn] (2)(2%)		blaming, complaining, excuses				
Poor Work Habits [wp](26) (22%)						
Lax Work Ethic <100% Work Effort [we] (12)(10%)		arrive late, long breaks, unreliable, does bare minimum, sloppy mistakes, not focused full attention, socializing too much, procrastinate until things get real bad, getting distracted by little thing, not professional – not giving 100% to art or profession or company or direction or project				
Non-Initiating [wi] (8)(7%)		waiting to be told what needs to be done next, not challenging themselves to improve				
Unorganized [wo] (5)(4%)		poorly organized, lack of attention to detail, lacks research and note taking skills				
Holistic Meta-Perspective Gaps (lack awareness & perspective) [h] (42) 36%		of Industry (16) 14%	of Pipeline (process, systems, tech) (10) 9%	of Self (7) 6%	of Company (5) 4%	of Social Expectations (@ work) (4) 3%

Categorization decisions: Entitlement as an example of categorization problems.

The concept of *entitlement* (Table 14) is an interesting example of categorization problems. Many behaviours that might be judged as arising from entitlement could also, and arguably more accurately, be classified as arrogance or cultural misperceptions or naivety, and vice versa for behaviours judged as arrogant that might arise from entitlement. For this study I define entitlement (see glossary) as a perspective or position regarding rights and fairness in relation to the rights and privileges of other beings, that can be based on a sense of elitism (arrogance, superiority) and/or natural or systemic privilege. Natural and systemic privilege can be perceived to arise from nature, spiritual essence, political authority or power, mystical forces, or essential truths, but it is generally a socially acquired ideology. Examples include the perception of privilege arising directly from social class or birthright, as well as the perception of privilege that arises from ideological communications in North American progressive education, new age beliefs, and US ideologies (Twenge & Campbell, 2009). Ideologies of rugged individualism and the North American dream are supported by messages such as *you are special, you can do anything you want to, don't let anyone tell you that you can't do (or be) something, you deserve the best, you can be anything you want to be.*

The perceptual judgments about someone who is overcoming the odds to win (through ingenuity, strength, perseverance fuelled by heart and passion, commitment to higher values, etc.) tend to be valorized. Simultaneously, elitism in North America is considered to be particularly loathsome. As brought up a number of times by interviewees “there is a fine line between confidence and arrogance” (Sophia, 29:00) and according to one interviewee that line is different within development companies and teams. The messages of praise and admonition that are constantly echoed in North America by parents, media, educators and counsellors is a likely

suspect in the development of what is later perceptually judged as an attitude of entitlement (Twenge & Foster, 2010). But entitlement is not a behaviour. Regardless of whether or not someone acts and decides from a position of arrogance or rights, or from humility and service, the actual physical-temporal actions, for example the behaviours (including body language and verbal tone) and decisions, are most likely what are being judged. An educational focus on developing functional and effective behaviours, along with personal awareness regarding external and internal judgments of character and motivation, might inform learners' choices about how they act and how they model their interior belief systems to achieve the external and internal results they desire.

For the purposes of this study, I did not create an entitlement category because I could not identify sufficient actions, behaviours, or characteristics that interviewees directly attributed to entitlement and I cannot presume to judge an action as being such. But a number of interviewees used it as a causal category of behaviours, for example, that people behave a certain way because those people feel entitled, and so I included it in the results for question #2 on perceived causes of negative behaviour (see Table 16: Causal Categories Linked to Negative Characteristics).

Categorization decisions: Attribution tendency. The situation with the word and concept of entitlement is exemplary of most responses. Even though I asked for general behaviours and characteristics, most respondents started off not with behaviours but rather with categories that are not descriptive of behaviours but are judgments of various causes and intentions, in other words attributional. These included such categories as Attitude, Ego, Mercenary, Fearful, Shy, Arrogant, Lack of Understanding, Antisocial, Inflexible, Defensive, and Prima Donna. Although there may be cultural common-sense notions regarding these terms,

a fuller more validated understanding of meaning is required for the purposes of this research. Further, from an outcomes perspective, generic terms are not specifically useful until they can be validly operationalized into measurable behaviours that can be practised and reflected upon.

Generic and stereotype responses to the question of common characteristics of novice negative behaviour were expected, given the focus of the question on *common* and *top* characteristics. Therefore, the interview process and research design included probes for perceptible actions and decisions and environmental events by which the characteristics were identified rather than leaving it at generic judgments. So, for instance, a probe into the behaviours that indicate a lack of “loyalty” resulted in a response regarding “quitting mid-stream” for better pay along with a new negative category “mercenary” to explain the behaviour (Totec, 32:16). There was also an explanation of how the company expressed loyalty by not firing people the accountants would have cut much earlier. The leadership rejected termination based on an understanding of the bigger picture value of people beyond the current bottom line. The company’s loyalty was juxtaposed against what was perceived as an employee’s mercenary behaviours or motivations. For Totec, loyalty therefore involved a number of concepts that include decision-making based on a big-picture perspective of good companies having value that may justify lower pay; that a place to contribute with comrades in pursuit of a shared vision and mission is valuable; and that a good company values employees above and beyond short term economics. The context of a lack of loyalty as a negative characteristic (a gap) includes a lack of empathy and compassion for the business and team. As a side note, *loyalty* as just described was included as part of employee fit for a number of companies.

Totec’s perspective as an executive could just be a rationale for paying people less, but regardless, the ideas of empathy, compassion, and reciprocity are clear. These ideas came up a

number of times in the context of negative characteristics of novices and employees who lack a holistic perspective of the company as a business, within a tough industry that is heavily constrained and pressured by economic demands. There was a general sense that if novices understood the big picture they would have some empathy for the necessity of certain company decisions and actions, rather than taking things personally and positioning themselves oppositionally.

Categorization decisions: Social Skills as an example. Another example of the inadequacy of common categorical judgments came up in conversation regarding the perceived social skills of game developers, who are often categorized with terms such as *nerds*. The interviewee expressed the problem clearly:

I have guys that will come in super excited about having removed 1 clock cycle out of the interloop of some piece of code, and from the outside world that's a nerd with no social skills, but really it is not that they have no social skills, it is just that they are interested in something that most of the world doesn't care about. But you put them with another group of people who do care about that, and they have great social skills. (Qualopec, 13:45)

This example also brings up the need for holistic consideration of interdependencies in analyzing complex situations. For example, effective communication came up a lot in interviews, both in a negative context as lacking and in a positive context as an ideal characteristic. But, just as with social skills, it seems to me that there are many potential contexts and variables that impact the effectiveness of a communication and the perception of it, for example:

- A communicator's vocabulary, which needs to be sufficiently broad, complete, and nuanced for the task or topic
- A sufficient overlap of signifiers and signified concepts between the participants
- Self-awareness regarding feelings, needs, communication outcome intentions, and assumptions

- A sufficient level of social awareness to perceive what others might be feeling, thinking and needing
- The developmental-level framing of the situation and the participants
- Habits of thinking and behaving/reacting
- Perspectives, beliefs, assumptions, and models of reality (conscious or subconscious)

Category: Holistic Meta-Perspective Gaps. One consistent meta theme was labelled Holistic MetaPerspective Gaps in Table 14 with 42 references coded under it. Within the category are five subgroups that interviewee references pointed to as deficient but important. The subgroups are 1) the Games Industry itself, especially in the context of related partner industries in the entertainment-arts, IT and computer technology, business, manufacturing (merchandising for example), and marketing; 2) the production Pipeline (process, systems, technology, assets); 3) Self-awareness; 4) the Company overall and its place in the industry; and 5) Social Expectations in the work environment, or more specifically in the collaborative game development environment. These categories are inclusive of the majority of gaps identified in the responses. Labelling the holistic category as a metacategory highlights its potential impact on other categories through the employee's holistic knowledge and/or awareness and placing it at the bottom of the chart intends to communicate the foundational nature of holistic perspectives for the other characteristics.

Personal and propositional knowledge were the primary basis for holistic perspectives related to the subcategories Industry and Company with an added focus on procedural knowledge in the subcategory Pipeline (typically seen as being gained through experience). But awareness was the primary basis for the holistic perspectives Self and Social Expectations, which also still required personal, propositional, and procedural knowledge.

In many cases a metaperspective was seen as the cause or solution to a negative characteristic. For instance, a holistic perspective was seen as improving the probability that a person would understand how they fit into the big picture, align themselves with the production demands or fight against unreasonable demands, and be accountable, and therefore, was a partial antidote for Poor Communication (that included blaming, complaining, and excuses). A holistic perspective included awareness of their company, the demands on it from the larger industry and business realities, and how those demands impact the decisions affecting the production pipeline, which in turn affects the entire team as well as each team member's job. If they were also holistically aware of themselves and others, for example their own values, needs, desires, and proclivities in the context of the values, needs, desires, and proclivities of other team members and the company, then they were more likely to take a position of accountability, as long as they perceived the company, team or other individuals as honest enough to provide a basis for a rational choice. Understanding the pipeline enough to be aware of how their decisions would affect others down the line and the overall outcomes of the project also provided them with a position from which to accept accountability for their decisions and actions. Holistic awareness as described above can be seen as a necessary prerequisite to accountability. Otherwise, people would be held accountable for what they don't see and don't perceive themselves to control.

Categorization decisions: Outlying data. References that didn't fit a category were considered in order to gain further insight and clues from alternative perspectives and frames of reference, as per complexity research (Anderson, Crabtree, Steele, & McDaniel Jr., 2005; Bennett & Elman, 2006; Davis & Sumara, 2006). In the negative characteristic category there were only two outliers that didn't seem to fit within the categories. The first was a bundling of leadership characteristics with collaboration characteristics by the interviewee Kristina. There

was not a category for leadership as a novice gap, therefore I didn't code it directly but rather considered it covered by the coding of later stated attributes of leadership and collaboration that were distributed under the concepts of contributing, holistic perspective, and interpersonal and social skills. Most of the other references to leadership were specific to expert characteristics, although some research includes leadership as an emerging specific requirement for employees (Conference Board of Canada, 2006).

Further insight into Kristina's perception of leadership was gained through the question on personal mastery of expertise. In answer to that question she expounded on team leadership characteristics including a desire to mentor, the ability to evaluate interpersonal dynamics, the ability to assess situations and recommend solutions in the realm of team dynamics and business/company growth, and the ability and desire to look for additional resources outside of the company in order to support the team and company goals. She further stated that regardless of the job it is useful for anyone on a game team to understand what leadership is, including the different styles of leadership and the skills involved, as well as each person clarifying for themselves why they may or may not want to participate in leadership.

Kristina's perspective cannot help but be influenced by her role as a leader and owner, as well as having significant academic exposure to arts and business. The importance of leadership and management in creating the environment in which a team can practise collaboration is almost certainly less appreciated or even resisted by production people. A number of interviewees referred to management as obstacles, hindrances, or a necessary evil, whereas the perspective presented above is a senior-management side of the senior-management versus production conflict and sees leadership as a necessary part of the collaborative production process. Overall I find Kristina's perspective more holistic than the production workers'

perspectives mentioned, but pragmatically the question is whether the us-versus-them perspective is functional to the community that is asking the question, judged according to their agreed upon outcomes. For a novice who desires to be successful in the game development industry working on collaborative teams as an employee, reflective consideration of these questions is required, and that is better served by a holistic perspective and practice of reflecting on the big picture objectively from all angles and including all variables, as per the senior manager's perspective.

The second outlier was the concept of an entrepreneurial spirit, which was brought up in the context of a team skill. This was both interesting and confusing. Perhaps it is meant in a similar way as the previous leadership outlier, perhaps it means innovativeness (Baron & Henry, 2010), or perhaps it is in reference to an entrepreneur as having a more holistic perspective that places the team, company, or industry success above the protection of ego or personal success, and which understands and appreciates business and business decisions objectively rather than personally. This was interesting to consider but as an outlier it wasn't coded into any category. But both of these outliers did support and add to the conceptualization of holistic metacategory and holistic perspective gaps, particularly for the industry and company subcategories, in terms of a novice negative characteristic. Additionally, the idea of innovativeness, as an increasingly necessary skill for employees and for university outcomes, has surfaced in recent employability skills research and in subsequent US policy, and entrepreneurship is identified as a key element of innovativeness as those reports and policies define it (America Competes Reauthorization Act of 2010, 2010; Conference Board of Canada, 2003a, 2003b; World Future Society, 2010).

Category: Poor Communications. Within the Poor Communication category there are six subcategories: MisFit, Defensive, Superiority/Entitlement/Ego Myopic, Antisocial, Non-

Collaborative, Non-Accountable. I was somewhat surprised at the number and consistency of responses regarding non-communication as a major negative characteristic as distinct from poor communication. Although non-communication was a specific characteristic of novices, references to it implied it to be a general problem for all staff. One interviewee (Gianni) said that it is so prevalent that one major company implemented a *10 minute rule* according to which no one was allowed to spend more than 10 minutes at their workstation without telling someone they were stuck, based on the logic that after 10 minutes the person is wasting team time and company money and the company would be better off putting someone else in that seat. This was for all staff at a very high-end company with experienced veterans and experts. In this study, however, it was mostly referenced as a common novice issue that was either improved upon or contributed to termination. The characteristic is covered more fully in the discussion on perceived causes of negative behaviour.

Fit encompasses many variables but could be said to boil down to whether the person develops rapport and respect with the team, and this is primarily based on interpersonal skills or identity. Fit was a consistent topic and interviewees reported their companies spending a lot of thought and effort on how to maximize the potential for identifying fit and screening out misFit in the hiring process, rather than paying the significantly higher price of a wrong fit after the production process is in full swing. Anecdotally, I find team issues to be a commonly identified point of failure in the game industry. For example, at the March 2011 GDC conference I attended a presentation in which Alex Parizeau (from Ubisoft Toronto) remarked that he led a very talented competent team but they initially failed because they couldn't work together as an effective team. One interviewee (Qualopec) reported that their company sometimes didn't hire

competent grads because they observed the inability for that person to work effectively within student teams. In describing an ideal employee another interviewee put it this way:

in a larger company ... there's only 2 ways you could look at that One is, how brilliant is this person in terms of their very specific skill set, and the other one is just what kind of team fit are they going to be. And I don't think that anybody is under any illusion of how important team fit is. Because brilliant people, sometimes the most brilliant people are just terrible team players, and they don't work out. And you will hear this from any creative studio. I heard it from Pixar recently ... talking about how some of their most brilliant people they just cannot work with them, so they ended up getting fired. It is the same thing at [game company], it's the same thing at Radical, same thing here [game company]. (Amelia, 34:22)

Responses to the questions on situations where negative characteristics manifested (presented under Interview Question #3) and on perceptions of cause (Interview Question #2) brought up some interesting insights into the fit issue. I identified three causal categories associated with social and communication issues (Table 15): 1) Personal Traits: such as shyness, inabilities, fears (such as looking bad, or social fear), a desire to prove oneself, and unawareness; 2) Situation/System, External Factors: systemic causes from social systems such as upbringing (including cultural norms) and other institutional systems such as industry and education; and 3) Lack of Experience: lack of appropriate experience. While explaining a common situation Laura pointed out (perhaps stating the obvious) that

it's the same as any stressful household would be ... it's a matter of just trying to deal with those things inside, not...take it out on somebody else. If you're an ass ... nobody likes to help you. What industry could they work in if they are not going to be a nice human being? ... It is a basic human skill. [Interviewer: Can you learn to have a successful personality?]. Tough one. Hmm ... you're not hiring people to learn, you expect skills to be in place, both technical and personality wise. [Interviewer: but if the schools don't teach that, but it has to happen before they get to the workplace, where will this happen?] Yah, I agree, that is the school's main priority.... So, what do we tell students? Don't be a jerk, even if you're really good. Cause you want to make friends. Making friends in the industry is a huge way of being successful. A successful seasoned veteran would likely have a strong network of people that like him and want to work with him. (40:00)

This discussion and other perspectives on personal traits led me to reflect on whether, or to what extent, behaviours at home and school can be considered a predictor of probable successful or dysfunctional work behaviours. Interviewees perceived schools to have an obligation to mentally and experientially prepare students for successful navigation of life and work. As an educator who is up for the challenge I questioned whether one way to do this would be to simulate appropriate environments such that success in those environments could be a high probability predictor of success in actual environments. Otherwise, key success variables related to personal and other awareness and interpersonal skills will be left to chance. In that case, if one's identity happens to match the values, vision, perspectives, lifestyle, work habits, and preferences of the team then rapport will be highly probable, but to the degree they are different then the person will require awareness, management of self and the development of productive relationships to create a fit. Veterans and older more experienced persons would most likely be more aware and more able to manage identity conflicts than younger people and novices.

Some of the issues regarding categorizing entitlement have already been discussed and won't be revisited here, except to restate that the goal was to categorize actual behaviours rather than judgments of behaviour. But, where to categorize a behaviour, which can be an important consideration for informing interventions and educational methodologies, is connected to the perceived cause or motivation behind the behaviour. Methods to best help someone who is perceived as arrogant might be very different if their behaviour actually arises from insecure fear and poor training than if indeed they simply believe themselves to be superior. Because the study was focused on understanding developers I tried to use categories that reflected their perceptions. The subcategory labels of Superiority, Entitlement, and Ego Myopic were chosen to provide a sense of how behaviours were being conceptually framed. A number of interviewees did use

caveats, for example that behaviours perceived as arrogant could arise out of arrogance, insecurity, or naivety, or that stubborn argumentative behaviour could be a display of perceived superiority, but it could also be motivated by a principled commitment to a team's highest good, or maybe even a personality disorder.

In most cases the perception of entitlement was connected to generational traits and differences. One interviewee mentioned his experience at a recent conference where he had an in-depth conversation with many international colleagues who collectively came to the conclusion that, increasingly, issues arising from young peoples' sense of entitlement were a global phenomenon that both educators and employers need to deal with. No interviewees expressed confidence in the current state of education to provide solutions, and some interviewees expressed the perspective that education was a contributor to the problem. Anaya started off by attributing ego issues to personalities, but later gave an example of an MA student on a co-op who didn't want to do mundane jobs and complained saying "I'm a Master student, I don't do that [grunt work]" (39:00). Anaya then reflected further and after a minute or so of silence said that even though it seemed counterintuitive she found "the higher the education, the more ego" (41:00). She elaborated on unrealistic expectations that schools can unintentionally create in the pursuit of giving students their best because the industry may not have the same level or quality of service or technology. She gave an example of students who weren't happy to work at a particular company because it had what the students perceived as old, inadequate computers and outdated or missing software.

Anaya's perception of the direct correspondence between higher education and bigger egos goes against the perspective that graduate school and graduate students are more mentally, emotionally, and socially mature, and more aware and holistic and therefore less sabotaged by

ego-related problems. But she was saying that along with higher education came an increasing sense of elitism, superiority, or entitlement. She was describing her experience dealing with university co-op students so her experience may have no generalizability at all, but the general trend in what is perceived by the older generations as entitlement and narcissism is clear, as previously presented. Another interviewee commented,

some of the young guys that come in don't feel like they have to work as hard to be successful, they don't feel like they should work on projects that they don't want to work on, in order to earn their stripes ... [and they] don't feel like they have to prove themselves before being rewarded. (Amelia, 43:00)

And it appears probable to me that the systemic factors that create, encourage, support and/or don't oppose those perceived characteristics are ingrained in the educational system as well.

Although there are nine references directly attributed to the Non-Collaborative category, there were related references attributed to the Fit category, and the interviewees perceived the importance of collaboration as far greater than the nine references reflect. Collaboration was seen as an absolute necessity. Of course non-collaboration is intricately enmeshed with sociability and fit, but whereas fit, poor communication, and even antisocial behaviour might be tolerated if the person was extraordinary in their productive capacity, the team will be unsuccessful if collaboration does not occur. In the long term an exceptional non-collaborator would more likely be contracted to work from home or for short specific projects to take advantage of their exceptional value with minimal pain to the team. "Nine out of ten producers prefer good people above technical skills, except for short term contract work for a specific job, especially if they are working remotely" (Alister 51:00). Hewner and Guzdial's (2010) research found the same perceptions among game developers. People skills ranked extremely high, higher than technical skills, but "the skill that was consistently ranked highest was the ability to work

on a team without excessive ego” (p. 278). Other related issues raised by developers included an unwillingness to take advice and poor communication.

Defensiveness was categorized separately because of the number of references and the emphasis placed on its opposite as an absolute requirement for success in the industry. Its importance is also less obvious than other categories such as Antisocial. In this study I described the opposite of a defensive characteristic as *a humble receptive attitude towards feedback and constructive criticism*, which is necessary because game development is 1) collaborative (it is not a person but a team that makes a game) and 2) iterative, which means that ongoing constant reviews and changes are part of the process.

Educating and training students in appropriate social behaviour to minimize unsuccessful antisocial behaviour would appear to be a need for game development educators. But effective and efficient curriculum development would require more information regarding what percentage of students specifically present with these problems and what are the sources of the problems (which is important for defining the type of curricular intervention). Antisocial behaviour is a pretty extreme form of poor communication. It typically results in conflict and, along with extreme cases of the above negative characteristics it will most likely result in being fired, or if it surfaces in the interview process then the company would probably not hire the person to begin with. As a production team member viewed it,

attitude is very important, because I know a lot of people that were very talented but jerks to work with and they didn't last ... and ... a lot of the people I work with are still here ... because of great attitudes. (Marco, 1:45)

According to another interviewee, people are most often fired not for a lack of technical skills but for negative attitudes.

It's not just in the games industry it's everywhere. All ... good employers are looking for people who have a positive attitude, even when times are tough ... You can have a brilliant

guy but if he is constantly being negative ... then sooner or later you are going to say “see you later.” (Totec, 16:30)

But there is a consistent dilemma that managers and teams must deal with, which one manager (Werner) named the *talent-to-grief ratio*. The more talented a person is the more grief people will put up with (up to a point). Also, the more desperate the need and irreplaceable the position, the more grief the team and company will put up with for the greater good or for a particular purpose. As described by Anaya,

even if you are a superstar and able to do all your work in an hour a day, you can't [be perceived as not working hard] because it is a team effort ... [but] it's all market driven. If the market needs them badly then it won't matter about their attitude. (21:00)

Laura gave an example of a guy who worked on the movie *Shrek* who was a bit of a jerk but his resume was so impressive that the team felt it was worth the price.

One implication from these references is that regardless of the level of talent that students believe they might have, it is highly improbable that their talent will be sufficient enough, or their abilities developed enough that they can ignore the interpersonal skills that contribute to the primary novice gaps. Interpersonal skills are required for being hired, and lack of them is the most common reason for people being fired (Beach, 1982), other than external factors such as a lack of work. As well, it is highly unlikely that students will be able to enter the workforce with enough experience in a desperately needed area that their lack of personal skills will be overlooked. And if through careful planning they are able to enter the industry at the right time and right place with desperately needed skills, once those skills are no longer desperately needed, they will have to face the consequences of their personal-interpersonal shortcomings.

In the Non-Accountability subcategory, Gandalf had this to say:

Teaching students to be accountable...that would be the most valuable...it doesn't matter what you're learning, in any industry you have to be accountable for your own personal

growth.... You're the only person responsible for your actions. They gotta know that right off the hop, because that's what's gonna make or break them. (Gandalf, 55:00)

Although the Non-Accountability subcategory had only two direct references it is closely related to Work Habits and Holistic gaps. From my perspective, the category represented a type of communication tip-of-the-Holistic-and-Work-Habits-iceberg. Behaviours of blaming, making excuses, and complaining, assuming they are authentic and not a fraudulent manipulation, evidence a perspective of powerlessness or lack of choice within a context of some sort of injustice. In the context of this research such a perspective could be labeled an unaware victim perspective (unaware of having choices) in reference to the desired outcomes of both the employee and the game company. That is not to say that there are no valid complaints, but people who consciously refuse to position themselves as victims tend to use different language and communication; and participation in the games industry (as in all passion industries) is to a significant degree a lifestyle choice and not just a job or even a career (although the industry has now matured and grown to the point where there are jobs and careers without passion in it).

Interviewees clearly identified the work ethic of the game development industry (as a passion-based industry) as including full engagement, full participation, and a willingness to do whatever it takes to get the job done. And because the process is collaborative with multithreaded dependencies, if one team member fails to deliver, and failure is not a team option, the other members do whatever it takes to get the job done, which usually means extra time and stress doing that person's work. Non-Accountability as intended in the context of this category is about the perception that team members are not taking personal ownership of completing their deliverables on time and up to snuff, as evidenced by not delivering and then by deflecting blame. Personal ownership is at least partly evidenced by self-initiating behaviours as per the Poor Work Habits category.

Category: Poor Work Habits. Within the Poor Work Habits category there are three subcategories: Non-Initiating, Lax Work Ethic <100% Work Effort, and Unorganized. As mentioned under the Non-Accountable subcategory, the cultural expectations and demands of the game industry are for passionate fully participating team players working for a common passion-based goal. From the Holistic category perspective, that means informed, aware, balanced and self-determined participation. Informed awareness includes a functional level of knowledge (self-researched and self-gained) combined with a functional level of awareness of self, industry, company and production (for example, collaborative process, pipeline, technology, product, and vision), and interpersonal and social awareness. Behaviours described under the first two categories, Non-Initiating and Lax Work Ethic <100% Work Effort, are seen as characterizing a lack of passion, motivation, holistic awareness or discipline/commitment, or another major issue that would make a person an unsuitable fit for the game industry. The Unorganized category is not as critically serious although it is still perceived as important for success.

Interview Question #2: Perceived Causes of Negative Characteristics

Table 15 lists the perceived causes of negative characteristics and Table 16 lists the negative characteristic categories that could be directly identified with the causal categories. There was no expectation of a one-to-one correspondence between the characteristics and the causes because the two questions were usually separated in the interview. The cause question often came considerably later in the interview, and interviewees often did not fully remember their specific answers to the negative characteristic question. As well, many references came out of discussions on other topics.

Table 15: Perceived Causes of Negative Characteristics	
Categorized and Coded by Internal References Only (without reference to the case or negative characteristics)	
Perceived Causes of Negative Characteristics	Perceived Causes of Negative Behaviours
Lack of Experience 56 (45%)	
Inadequate Formal Education (31) (25%)	uncorrected ignorance, idealism, or naivety
Lack of Work Experience (20) (16%)	lack of real relevant experience
Inadequate Home & Life Education (5) (4%)	lack of accountability, errant expectations, conflicting values
Personal Traits 55 (44%)	
Internal Tendencies (18) (15%)	lack what it takes, timid, socially challenged, not outgoing, left-brain artists, shy programmers, entitlement
Insecurity & Fears (11) (9%)	fear of looking stupid, intimidation, low confidence, low self-esteem, fear of rejection, “rather get in trouble for not showing it than facing the criticism”
Proving (4) (3%)	focus on impressing, go overboard - too eager/excited, shining and proving, bravado (some deeper need to put on a front, e.g., fear)
Developmental Level (8) (6%)	ADHD, age immature, underdeveloped skills that come with years of doing
Self-Awareness (7) (6%)	self-awareness, lack drive or ambition, “self-assessment is not taught”
Emotional Management (4) (3%)	negative emotions, too sensitive, take it personally
Cross Purposes (3) (2%)	cross purposes: self-interest over team/company, conflicting or subverting goals (“students came over to avoid the draft”)
Situation/System (10%) External Factors 13 (2%)	“every company has different [job] definitions,” schools’ advertising can confuse, language (ESL), rapid technology changes, industry promotes misconceptions, some problems are built into industry culture, misperceptions come through the media, expectation of constantly improving technology to solve problems

Table 16: Causal Categories Linked to Negative Characteristics	
Higher ranking causes are color coded: Level 1 (high) Level 2 Level 3 (low)	
Negative Characteristics	Causal categories directly associated (by one or more interviewees)
Poor Communication	Insecurity & Fears , Lack of Experience, Lack of Work Experience, Personal Traits, Internal Tendencies, Proving
misFit	Lack of Experience, Insecurity & Fears , Inadequate Home & Life Education, Internal Tendencies, Emotional Management, Situation/System--External Factors
Defensive	Insecurity & Fears, Emotional Management , Inadequate Formal Education
Superiority, Entitlement, Ego Myopic	Internal Tendencies , Inadequate Formal Education, Insecurity & Fears, Self-Awareness, Situation/System--External Factors
Antisocial	Lack of Experience, Lack of Work Experience, Emotional Management
Non-Collaborative	Inadequate Formal Education , Lack of Experience, Inadequate Home & Life Education, Developmental Level, Self-Awareness, Emotional Management
Non-Accountable	Inadequate Formal Education
Poor Work Habits	Lack of Experience
Lax Work Ethic, <100% Work Effort	Lack of Experience, Inadequate Home & Life Education, Situation/System--External Factors , Lack of Work Experience, Insecurity & Fears, Developmental Level, Self-Awareness, Emotional Management
Non-Initiating	Inadequate Formal Education, Developmental Level , Lack of Experience, Inadequate Home & Life Education, Insecurity & Fears, Self-Awareness
Unorganized	Inadequate Formal Education, Internal Tendencies, Situation/System--External Factors
Holistic MetaPerspective Gaps	Inadequate Formal Education, Lack of Work Experience, Lack of Experience, Self-Awareness, Situation/System--External Factors , Personal Traits, Internal Tendencies, Insecurity & Fears, Proving, Emotional Management, Cross Purposes

Some negative characteristics without a specific causal link were assigned to a causal category if it seemed conservatively reasonable to do so, and these were added to the sum for each category. References that were self-referring to the category were always coded to the related cause, for example characteristics identified specifically as a lack of self-awareness.

Characteristics that were considered reasonably clear based on the interview context were also

coded for cause. For example, consider the following four characteristics, from two different interviewees, that didn't have specified causal references and [how they were coded] in brackets:

1. Unreasonable undoable solutions/decisions [Lack of Work Experience]
2. Don't communicate, don't ask for help, struggle on own for too long [Personal Traits]
3. Poorly organized: naming issues [Personal Traits]
4. Interpersonal problems, hang-ups, social issues [Personal Traits]

The context for response item #1 was the novice's lack of experience in commercial game development needed for quick problem solving. Until they experience it, novices can't understand all of the nuanced constraints encountered over the course of a project, so a novice's decision may be unreasonable or impossible to execute. Even though the response wasn't specifically about causality, it was reasonably clear that the characteristic being described was perceived as attributable to inexperience. For item #2, the characteristic of not asking for help came up in the context of the Common Situations question related to interpersonal behavioural issues hindering collaboration. When the interviewer pointed out that a negative novice characteristic had been named, and suggested some possible causes such as fear or shyness, the interviewee agreed these were possible but did not comment further except to confirm that the negative novice behaviour would be "struggling for too long" (Kristina, 31:36). The best fit given this context was deemed to be the Personal Traits category without enough data to subcategorize it.

The situation was the same for items #3 and #4. Margot talked about poor organization skills along with personal hang-ups, including being unwilling to adapt. Later on when asked about causes, she linked the unwillingness characteristic to artists being left-brain dominant, by which she meant an artistic mentality that had a disposition towards independence. I deemed it

probable that her perception of the poor organization characteristic was at least partially connected to the left-brain dominant tendency as well and therefore would fit best under the general category of Personal Traits and could not be further defined by a subcategory.

Table 17 compares the counts of causes that were directly identified with those that were considered implied. As discussed previously, comparing sums was not meant as statistical analysis but only as an additional qualitative check on the categories, that is, a type of triage that approaches the data from a slightly different angle. Although the total number of references was greater for indirect references because of adding probable causes, the percentages between the two sum totals were almost identical.

In Table 17 the subcategory Proving is placed ahead of Developmental Level even though it has fewer references in order to better associate it with the Insecurity & Fear subcategory. In the perceptions of interviewees the two categories were closely related and consideration was given to collapsing the subcategory Proving into Insecurity & Fear. The decision to keep them separate was based primarily on the subtlety within the responses and the informative value of representing the differences. While Insecurity & Fear could be the motivation to *prove*, other factors were possible and so they were kept separate because interviewees mentioned them separately and seemed to separate them conceptually.

Behaviours that were grouped together to arrive at the categories, such as “hiding issues” and “spending too much time on a problem,” were viewed by some interviewees as arising from the same source, for instance a fear of being proven inadequate, and by other interviewees as arising from different sources or multiple related and unrelated sources, such as some combination of ignorance and lack of experience, high standards, over eagerness, a need to prove oneself, and artistic tendencies. Behaviour judged by team members as arising from

Table 17: Comparative Counts for the Causes of Negative Characteristics	Direct References		Including Indirect References		
	Count	%	Count	%	
Lack of Experience 56	56	45	(92) 21	(43) 10	44
Inadequate Formal Education (31)	31	25	43	20	
Lack of Work Experience (20)	20	16	15	7	
Inadequate Home & Life Education (5)	5	4	13	6	
Personal Traits 55	55	44	22	10	47
Internal Tendencies (18)	18	15	16	8	
Insecurity & Fear (11)	11	9	15	7	
Proving (4)	4	3	6	3	
Developmental Level (8)	8	6	8	4	
Self-Awareness (7)	7	6	19	9	
Emotional Management (4)	4	3	5	2	
Cross Purposes (3)	3	2	7	3	
Situation/System 13			20		
External Factors	13	10		10	10
Totals	124	100	210	100	100

even a marginally negative source such as insecurity would likely have different results for the team than if it is judged as based on a positively perceived source, such as the desire to prove value, or take ownership. Further, sources such as the desire to prove value can in turn be perceived as arising from other sources such as a desire to contribute or to be accepted, or a fear of not being accepted or of being proven inadequate. In the final analysis, keeping the Proving subcategory separate was deemed more representative of interviewees' perceptions and more informative.

Causes were also regularly convoluted with characteristics and many references to characteristics, behaviours, and causes were used interchangeably by interviewees. For example, "fear" and "unawareness" were referenced as both characteristics and as causes of characteristics. Similarly "shyness" was referenced as a cause of negative behaviour based on it

being a personality trait, but it was also referenced as a normal behaviour (although negative) arising when people face new unknown social/work environments.

From a pragmatic holistic perspective the distinctions being made in the categorizations cannot in practice be separated. Holistically viewed, a person's characteristics and behaviours are a confluence of all the environmental and situational variables, including proclivities, upbringing, education, environment, and situations. But there is pragmatic explanatory value in the categorizations, and in this case the concepts of personal traits and lack of experience were differentiated from a systemic category named Situation/System because the interviewees' responses indicated a perceptual differentiation.

The systemic category (Table 15: Situation/System, External Factors) was created to represent perceived causes that reside in identifiable entities that people have relationships with, and which impose an identifiable external consciousness on top of the environment. For the most part these entities are organizations, but technology itself can be an entity. Whereas familial and cultural agents primarily influence through implicit enculturation (of knowledge development, perspectives, and assumptions), organizations such as businesses and colleges vying for clients and customers also create influence through media products, promotions, and advertising.

The systemic category also includes political, legal, and regulatory systems in which problem situations occur that would not otherwise arise within a more insulated community. Similarly, environments immersed in continuous technological innovation, such as the game industry, create acclimatization to, and expectations of, leveraged value from the ongoing adoption of leading edge technology. I consider regulatory, technological, and other such variables to be more temporary, externally perceived or objectified, and therefore tend to produce less ego-identified outcomes than more traditional socialization and enculturation

systems such as family, religion, and school systems. College advertising and recruitment for customers is a more temporal event than, say, the hidden curriculum (discussed further on) in the K-12 system. These variables are also distinguished as being more external than personal traits perceived to be controllable by the person.

The Lack of Experience category was divided into three subcategories focused on the perceived cause of negative characteristics arising from 1) formal educational experience or for which education was seen as accountable, 2) gaps based on a lack of work experience, and 3) gaps and dysfunctional training from primary socializing and enculturating agents. These categories were all generally perceived to contribute to a lack of adequate or appropriate holistic perspective, knowledge, skills and experience, but were also seen as directly responsible for some negative characteristics. Of the three, education received the harshest and largest number of criticisms, probably due, at least partially, to its primary and self-proclaimed role in educating game developers and successful citizens, and because the research context was education.

The Situation/System category included responses that identified education as a systemic contributor to negative characteristics, as well as systemic issues within education that contributed to negative characteristics. The Inadequate Formal Education subcategory includes responses where negative characteristics were perceived as correctable problems that should have been addressed by educational programs because those programs claim to be designed to prepare graduates for work and world.

In reflecting on whether education is best positioned as a solution or as part of the systemic cause, it would not seem valuable to assign causality to education for not addressing any particular problem simply because the problem could be addressed by education. From a pragmatic perspective, a relevant and appropriate group would need to agree that education will

be the agent to address the issue or to pass on specific cultural capital, and if it then fails to do that, there is justification in requiring an accounting. But my sense is that interviewees assume as common sense that education is the agent, though this is a contested position within the previously discussed purposes of education. If significant problems arise from a systemic base outside of education, and if those problems could be averted with education, then education might be better positioned as a potential solution. But if the job and purpose of educators and their curriculum is to uncover the relevant variables and use education to empower people to overcome obstacles then they could reasonably be held accountable for either not uncovering the necessary variables or for failing to empower students. This seems to be the implicit perspective of some interviewees. For example, there is general agreement that motivation is important for learning, and there is considerable evidence and agreement that experience of real-world activities and consequences is motivating. One interviewee stated that “having real world incentives tied to industry is important. I would advise education to do this” (Pierre, 30:00). This is sound advice in alignment with common educational wisdom. But would it be of value to say a school that doesn’t make this a practice, for whatever reason, is a significant cause of the problem of low motivation? It is not surprising that people would hold the education system accountable for what they perceive as needed based on their common sense perceptions.

As previously mentioned, perceived causes (however diagnosed) can impact the choices educators make for curricular interventions into what they perceive as negative behaviours. If fear and insecurity are believed to be the cause of behaviours that are being perceived as arrogant, as opposed to a belief that they arise from a belief in superiority, then very different interventions into the behaviours may be chosen. But many fields including psychology, business change managers, and conflict resolution specialists (Greenberg et al., 2003; Kegan &

Lahey, 2001; Logan, King, & Fischer-Wright, 2008; Rosenberg, 1999b) have demonstrated the effectiveness of abandoning character judgments, that are likely to be perceived simply as attacks, and instead facilitating self-reflection on behavioural consequences relevant to the individual's goals. This method empowers people to decide for themselves if their schema works for their needs.

Many references were made to formal education being accountable for a lack of experience as a cause of negative characteristics. References included school being too algorithmically laid out such that students did not receive sufficient practice in filling in the gaps; the lack of holistic perspective-taking that is needed to avoid common myopic tendencies; teachers that didn't inspire greatness; and a failure to deal with negative characteristics, for example "quirky problems," that will hinder success. A number of points came up repeatedly. One was a failing to educate students in the hard harsh realities of the industry. Many interviewees seemed to perceive this as an obvious responsibility of education, with failure potentially classified as misleading students. For example, Gandalf portrayed some instructors as trying to build confidence or sell the school by telling students "if you're good enough you'll get in," or "don't worry you'll get a job" when they should have been saying "you're crazy to be [trying to get] in this business right now. I can't believe you're taking this course." He went on to say that other instructors told him not to talk to students this way but his reply was

you got to tell them ... because they're going to go out and blame the school otherwise ... students ... think "I'm going to come out and get that six figure job and everything's going to be great." It doesn't happen that way. (Gandalf, 54:00)

This reference touches on educational issues of misleading students, not correcting negative characteristics and misperceptions, not teaching necessary characteristics such as accountability, and protecting from, rather than preparing students for, work and world realities. Students are

not provided with significant opportunities for deliberate practice in environments and situations that are experientially accurate to work production environments.

Educators were not seen as purposely misleading students, but that didn't absolve them of accountability. But without getting deep into systemic issues, I want to point out that it is unreasonable to expect every school counsellor or advisor to fully understand the game industry as well as all other industries that students would be interested in. They might unknowingly mislead students regarding the realities of any specific career, especially those that change rapidly. But surely the program itself should paint an accurate picture, should it not?

Unfortunately, some of the results of this research support a conclusion that there is a significant gap in accuracy. Consider for example the implications of the previously mentioned university game development champion, who had developed and taught a prestigious game development program with significant initial and ongoing industry input, then after spending a summer as an intern at a major game developer declared his realization that academia and the game development company were nearly clueless about how each other operated (Pausch, 2004).

The misperceptions (also referred to as naivety, ignorance, idealism) that education was seen as failing to nip in the bud included the student perception that making games is fun (like playing games is), that game developers play games all day, that a game design job would be like a paid auteurship¹¹ (like being the movie director with full artistic control), and other job related misperceptions. Students arrive for work without an experiential understanding or accurate knowledge of what it takes to make a game. One interviewee paralleled the situation with how some children might think it fun and cool to make the toys they like, but the reality of actually working in a toy manufacturing plant would probably not be fun at all. Consider the list

¹¹ Auteur is a term coined in film theory to describe exceptional directors who so influence the movie through their creative vision and direction that they became the author of the movie.

of student illusions in Table 18 that an educator who is also a game developer collected from teaching game development to university students. Interviewees in this research identified many of the same illusions. Most seemed mystified how adults who have reached a university level education and with a passion for game development (or related fields such as art or animation) could enrol in a program and still have these illusions, much less how they could graduate and arrive on their first day of work with them. Educational institutions were seen as having the main accountability and no reasonable excuse.

Some interviewees suggested the industry and students themselves also have some accountability for the novice *illusion* issue. The issues are complex, however. One interviewee confided that although she had known with clarity that she wanted to be an animator since before she was a teenager, she didn't fully understand what that meant until she started working in the field. From a pragmatic perspective this aligns with the theory that humans require what Schön, Dewey, and others have referred to as knowing in or through action and helps to explain how the situation occurs. The situation is demystified even more if it is considered in the context of common heuristic thinking (rather than formal logic) with cognitive biases such as durability bias (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998) and in better-than-average effects (Burson, Larrick, & Klayman, 2006; Kruger & Dunning, 1999). Durability bias results in consistent overestimates of satisfaction and happiness levels and longevity resulting from specific activities such as career choices. The better-than-average effects occurs when a lack of metacognitive insight results in poor decision making based on an inability to perceive the limits of one's abilities and to accurately predict performance. From an educational perspective this means that accurate simulated or real experience is an absolute requirement for some educational goals.

Table 18: Student Illusions About Being a Game Designer (Pulsipher, 2009)

- They'll design a game and someone else will do all the work
- It's all creativity instead of work
- Ideas will just come to them, floating in out of the ether -- and that one idea is all they need
- AAA list games can be produced easily
- They'll play games all day in the job
- It matters that they're expert game players
- They'll be able to design what they want
- They're going to have a big effect on an AAA game soon after getting a job
- Getting a degree is going to get them a job
- If they just make a game that includes all the currently-popular elements (a market-driven game), theirs will be instantly popular
- They'll be able to assemble a development team without salaries and get things done on schedule with the promise of royalties once the game goes commercial (although at least this happens every once in a while)
- They'll start their career working in the position they want to achieve in the long run
- They think the college curriculum is an extension of high school and act as such
- They will only work on hard core games
- Work will always be fun and they will always enjoy playing the game they create at the end
- They will never make a game that gets cancelled
- Testing is only about playing games
- They can sneer at and ignore non-AAA titles as though there was something wrong with them and they'd never need to work on such a thing
- It will be easy. There's always an Easy Button, isn't there?

Regarding collaboration, some interviewees reported on programs that are attacking the problem directly. One interviewee described a group production project where the expectation was that students would fight, butt heads about artistic decisions, and ultimately fail miserably, because the intended learning wasn't about production process or techniques but about the direct experience of how hard it is to work as a team and produce product based on complex integrated dependencies. Another course was described that was designed specifically for a Computer Science (CS) program because the CS program didn't teach the necessary interpersonal skills and psycho-social awareness. This interviewee said that in general the CS curriculum does not give students the guidance they need about what they should be doing. He added, "we turn

people out who are really good at solving problems, they just don't know what the problems are" (Yarofev, 1:21). In the course being described, students were informed that the two-term (one year) course was far longer than any of them needed to complete the project working alone, but they had to do it in teams of at least eight, and after a year some of them will discover that they were unable to do it. The sole learning outcome of the course was the understanding that teamwork is a lot harder than working individually. The course tried to achieve this in a context that was authentic to what graduates may find themselves in by simulating chaotic stressful work realities in various ways. One way was to send each team a memo during the term break informing them that their company had been bought and that half the team would be split off and joined with a different team, which the teacher assigned randomly. Specifications might also be changed randomly. Students would of course complain and be indignant at the unfairness but it was explained to them that this is what happens in real-life. Education/curriculum modelled on real-life production environments was a very big shock and conflicted with their beliefs about educational entitlement. Other interviewees perceived school to be too insular and insufficient in exposing students to the vulnerabilities of the private business world. Suggested solutions included allowing students to be fired from their teams and 360 (peer) reviews regarding all aspects of their performance.

On the opposite side of this coin, some university interviewees presented a perspective that the educational duty is to empower students with alternative ways of viewing work and world realities, and not necessarily to promote an acceptance of the harsh realities, particularly when it concerned the issue of crunch-time or the treatment of people as cogs in the machinery (mostly a big company issue), but also for provoking reflection on alternative careers and ways of being in the world. This point brings up questions about the purpose of education, for example

as emancipatory rather than vocational, and the difference between education, training, and indoctrination.

The lack of actual production experience was often an initial default response for the cause of negative characteristics. After all, if a veteran and expert arrive at those titles through the path of experience, then a lack of experience is a reasonable cause of any non-veteran or non-expert characteristic. One of the key ideas that emerged from interviewee discussions on this topic however, was the perceived correlation that a lack of real world experience had with a critical negative characteristic, which was the lack of a holistic perspective and knowledge. Some perceived work experience as the best and sometimes the only effective path to acquiring expert holistically-derived abilities and perspectives related to the business and process of game development and to good decision making that accounted for below-the-surface effects of decisions on seemingly unrelated aspects of the process and organization. Good decision making included accurate estimating, problem solving in complex situations, ability to prioritize and accept or let go of certain ideas (for instance when corners or features had to be cut) based on the big picture and overall purpose, and decisions that made the team and/or pipeline more efficient and effective. One example given by a few artists demonstrated the lack of novice holistic perspective. In the example novices created a base (template) model without fully understanding or researching the needs for that model in the game. For instance in a boxing game, the model must be able to handle impact, bruises, cuts, etc., but if the original base head didn't account for this adequately, someone will have to go back and fix every individual character derived from it.

One interviewee made a further distinction between work experience and specific work experience that may be significant. In his words,

if you came to me and said, yah, this is a guy who has been involved in games for ten years, but has never been involved in shipping a game, and you compare that to a guy

who has been in the industry for 3 years and has shipped two games, the guy who has been in the industry for 3 years and has shipped two games, is gonna ... have this certain something, I'm not sure I can really explain what it is, it's the real experience of actually all the little things it takes to actually get the product out the door. It's a really hard skill to learn. (Qualopec, 51:10)

In support of this perspective, some expertise research has identified a specific type of experience, labelled deliberate practice, that is optimally effective and efficient for acquiring expertise (Ericsson, 2000a). It is not necessarily real-life (work) experience, because life experience is often unconscious, unreflective, and random. Educators may do well to consider the ramifications of this perspective for curriculum.

Relative to other topics, the references in the subcategory Inadequate Home & Life Education, which focused primarily on culture and upbringing, did not bring up as much discussion or elaboration, probably because the issues and causes (of the categorical cause) were perceived as obvious and relatively out of the control of education and industry. Some of the points brought up were that Asians were perceived to be generally quieter than other groups; communication issues caused by language could be serious, especially for games where additional technical language is used; generational differences are evident in the game industry and contribute to issues; and some families, cultures, and religions have values and/or practices that may result in behaviours that conflict with expectations and create discord or confusion. Greed, competitiveness, and materialism were mentioned as learned values that can be the cause of negative characteristics. As well, a lack of accountability was attributed to upbringing. Families were likened to "the first company we work for. Did your parents ... model perseverance and consistency in how they dealt with you? If they didn't hold you accountable then you learn that is how the world works" (Totec, 51:57). A generational issue was also brought up regarding an older ethic of hard work and appreciation for what one has, versus

younger people with a sense of entitlement and “take things for granted and are not careful with them at all ... iPods in back pockets and through the washing machine. They just consume and consume things” (Pierre, 48:10).

The Personal Traits category. The causal attribution of traits was brought up in Chapter 1 regarding student resistance to soft skills curricula, then again under the subcategory of misFit in relation to negative behaviours common to life and home, and also in the introduction to the perceived causes of negative characteristics where an example was given of issues that arise from artists’ left-brain traits. The Internal Tendencies subcategory was based on references that directly attributed characteristics to fixed or innate traits or clearly implied it, for instance in statements such as “it’s not the school it’s the person,” (Totec, 21:00) when speaking of the motivation and drive fuelled by the passion of ideal new hires; “her problem is that she just doesn’t have the talent” (Alister, 55:00); “I don’t think they will ever get it...some people are just better suited” (Werner, 30:00); and “some [people with interpersonal issues] just will never change” (Werner, 1:10:00). “Arrogance” or “cockiness” was a trait identified a number of times as potentially innate, but interpersonal and social issues were the most often cited as resulting from personal traits, for example shyness, timidity, not outgoing (introversion), authority avoidance, fear of judgment, socially challenged.

Interpersonal and social issues were seen as related to the games industry, which attracts people with these traits. Programmers were referenced as tending towards these traits more than other groups. One educator introduced the idea that the computing science field attracts a “technical mentality” (Yarofev, 35:99), which tends to focus on technical solutions and overlook social aspects of problems, for example, thinking that if the code is fixed the problem is fixed. He also mentioned that in his experience the technical mentality was more prominent in men

than women. Similarly, artists were seen to have general traits such as being flighty, anarchistic, and having auteur-type big egos. These CS and artist tendencies were perceived as not all bad, but simply as contributing to negative characteristics.

One interesting comment associated disorganization with artistic traits as well as art itself, because art was perceived as a complex process that cannot be reduced to an algorithm (a step-by-step process). In order to deal with the complex creative production process, artists develop heuristic processes that he described as “rituals [in] which they follow something from beginning to end” (Marco, 14:00). This interviewee related these heuristics to what artists were attracted to and within their heuristic focus they tended to be meticulous in one area, getting it perfect, while doing only adequate work in other areas or perhaps not getting around to them at all. This issue is related to the myopia mentioned under Inadequate Formal Education but not the Ego Myopic negative characteristic listed under the Poor Communication subcategory. These descriptions hint of an obsessive trait. Perhaps there is some relationship to the rise in mental dysfunctions in North America, including acquired ADHD (Hallowell & Ratey, 2006; Small & Vorgan, 2008). Some interviewees self-identified with these traits and, anecdotally, I have spoken to many colleagues in many fields (not just artists) who self-identify with obsessive-compulsive behaviours they have to consciously manage in order to avoid dysfunction.

The subcategory Insecurity & Fears and the next, Proving, were presented earlier as being closely related. Insecurity and Fear were often referred to as traits as well as the source of behaviours that were the same or similar to Proving.

Under the Poor Communication category for Negative Characteristics, Non-Communication was expressed as a major issue. It was brought up many times and was emphasized by many interviewees from all levels of the development organizational hierarchy as

having significant negative effects on team success. The most common cause associated with this behaviour was Insecurity & Fear. A question for educators to consider is what implications arise from a situation in which employers and production teams identify graduates as having a major issue in non-communication based in fear and insecurity (whether the fear of being inadequate or the desire to prove they are adequate and able to contribute), but where students are also seen as pampered and protected from the realities of the game industry and where the education system itself is seen as a systemic contributor to both the behaviours and the cause?

The Proving category is distinguished from the previous two categories by the perceived distinction between a behaviour directly arising from fear as opposed to directly arising from a desire to impress. They collapse when the desire to impress is itself based on a fear or insecurity, but often the desire to prove oneself was seen as arising from enthusiasm, passion, and a desire to contribute. This was considered a positive cause. But enthusiasm was seen to motivate negative characteristics and behaviours when it wasn't directed by a holistic informed perspective. Overly eager behaviours without holistic understanding of the pipeline or the business and production realities, for instance, might result in behaviours such as a myopic focus on perfection at far too great a cost. Overly eager behaviours without holistic understanding of the corporate etiquette might result in stepping on toes. Inspired overly eager behaviours without holistic awareness of the self and of others' perception of the self might result in being perceived by the team as arrogant, argumentative or defensive, when internally the person believes they are displaying integrity and commitment to the team values and goals.

In the Developmental Level subcategory maturity level was mentioned a few times and not always in reference to age. Some interviewees related a lack of maturity to causal factors such as socialization and upbringing. Lack of maturity was also referenced to the idea of realistic

holistic perspectives of self and the world, which for most people are only acquired through life experience and therefore are indirectly related to age. Two interviewees mentioned that new employees in the games industry are getting younger and younger and lack adequate perspective and life skills. A “twenty-six or twenty-seven year-old with some post-secondary and some sense of what they want to do is very different than the kid right out of high school, [who] doesn’t have a clue” (Margot, 14:00).

In considering the perspective that life experience is necessary for developing maturity, or at least fosters it, another interviewee brought up the question (for which he didn’t have an answer) of whether students might be better off starting in the industry without going to school first. That question was addressed in a recent *Globe and Mail* article that argued for the value and, in some cases, need for students to take a gap year off, as is the custom in Europe, to discover themselves and experience life and/or work (Anderssen, 2011). The article referenced a study (Finnie, Sweetman, Mueller, & Usher, 2010) that reported 50% of Canadian students didn’t complete their initial programs of study because of a lack of personal fit with their choice of program or profession, not because of finances. Of those that withdrew from college and university, an average of 47% re-enrolled.

It may reasonably be argued that students enrolling in vocational programs in passion fields, and especially in programs with serious financial and time commitments, would not have the same lack of clarity or confusion that the university students tracked in the study had, but a number of interviewees commented on their bewilderment that this actually was prevalent in the classes they taught and in industry novices. Anecdotally, it is my experience that many students pursuing game or entertainment-arts paths are not a good fit with the K-12 education system, and therefore, may do poorly and not pick up the skills they need for post-secondary success,

including soft skills, which may be far more related to developmental levels than academic expertise (Drago-Severson, 2001).

In the development literature (Kegan, 1994; Kohlberg, 1981, 1984) one of the defining characteristics of any particular stage of development is an inability to see the inadequacies of one's own current stage (unless it is in transition) or to be able to view the world from the next stage or higher (though the possibility of the next perspective is able to be considered). Some other potential reasons for students' lack of self-awareness and illusions about job choices were discussed in the subcategory Inadequate Formal Education. One researcher (Kwok, 2004, 2005) found that university students overestimated their soft skills and lacked realistic self-awareness regarding their abilities and skills in critical thinking and teamwork. For educators, the constraints of developmental level on behaviour are important because those constraints cannot be removed by teaching about it; in other words, it is not a technical knowledge or training issue. Explicit articulation of the need and standards and measures will all help, but ability and capacity have to be developed and, as previously discussed, this may require experiential learning by doing (by deliberate practice in simulated or actual situations). Three authors who have specifically addressed maximizing acquisition of employability soft skills in university level curriculum are Evers, Rush, and Berdrow (1998). They have published educational resources for this purpose online, for example on the University of Guelph website as [Bases Of Competence Skills Portfolio Specifications](#) (Evers, 2005).

Self-Awareness was a subcategory of Holistic MetaPerspectives under the negative characteristic question. It was also an example of a characteristic that was convoluted with causes in interview responses and it was presented in question 1 as a meta theme that informs the other categories. Therefore, there is very little, if any, practical difference between the

subcategory here and under question 1 since it is almost always both a negative characteristic and a perceived cause of negative characteristics. In relation to a lack of drive or ambition, the subcategory Self-Awareness was associated with a lack of personal awareness of what one wanted to do and why, which is also closely related to a self-initiating work ethic that requires a high level of motivation. Self-initiating behaviours include research into the industry and potential employers and exploring game development prior to and outside of school. These types of behaviour would reduce negative characteristics related to a lack of holistic perspective. Understanding one's own motivation allows the person to make decisions and manage behaviours to maximize their results.

One highly educated senior manager with significant experience in many fields surprised me with the following admission about self-awareness.

I suppose we don't teach this in school actually. I am just learning it now. I am just working on self-awareness and I can't believe it wasn't taught in school, but yes, absolutely, there is a massive lack of self-awareness in game studios for some reason, and that is another culture characteristic of the industry. (Amelia, 23:32)

Varying perceptions of the cause of negative characteristics will have varying effects in complex situations. Because of this, awareness of self-states and of other peoples' perceptions are valuable abilities and skills in the pursuit of successful expertise.

Emotional Management and Cross Purposes are also both related to self-awareness and developmental level. People can only be where they are, but purposeful efficient movement beyond requires, in Dewey's terms, reflective (educative) thinking and in expertise language, deliberate practice. One producer talked about how he must constantly deal with interpersonal issues and conflicts over hurt feelings and perceived unfairness. People were seen as unable to separate from their ego identifications (my terms) so they took things personally or overinvested

emotionally in their work or ideas. They were not able to deal with situations objectively or let things go. This manager's words sum up many responses regarding these issues.

A producer's #1 job is dealing with people to keep harmony and working together to meet demands of time, quality, and budget ... [my] #1 job is trying to keep everyone happy, trying to keep everyone moving along and motivated, and it is the trickiest part of what I have to do. The rest of it is easy. You have a need to hire a position; you get the budget and do it. But if you have someone who doesn't like working with this person and it is causing conflict and low morale and that is starting to seep everywhere else, oh my god, that is the hard part. That kind of relationship building is the most challenging; I have to firefight a lot ... I wish I could say where the lacks in interpersonal skills come from. It is my #1 problem, and it is all individuals, and takes different amounts of time [for each] ... The ones that are successful are the ones that take direction, even if they feel like this [that they are right], and if they understand that the 10 year veteran that sits above them says no to their idea, if they take that and go, "ok, thanks" ... This week it happened, a senior guy with real credentials tells a junior person "I don't think you should do that," and they say "Nope, we're doing that," "Let's talk about it." "No." And it's like "dude, you can't have an attitude like that, especially with someone so experienced." (Werner, 5:08)

In the Cross Purposes subcategory, personal agenda and purposes that conflict with the company and team needs and expectations cause problems. This issue came up in a number of contexts including the frustrations of teachers who are passionately trying to contribute to the industry through mentoring future game developers, and in terms of personal clashes that team members have experienced with people trying to climb the competitive ladder or with people who need to feel superior. The pursuit and priority of self-interest may be considered appropriate or even admirable in many industries, but for a collaborative team environment it is deadly. It is especially loathsome when team members perceive others as nonreciprocal after the team has made significant personal sacrifices and then perceive insult being added to injury when these people manipulate others and the system in order to serve themselves at the expense of the team.

Awareness about balancing personal satisfaction with being an employee can be a hard one for students, especially if they don't grasp the big picture and links in the pipeline, and the

importance of every job to the whole. These perspectives can make all the difference in the experience of a job. One example given was a person painting backgrounds for FIFA (a soccer video game). It may seem really boring and unimportant to the artist, but to some of the hard core fans it might make all the difference.

Systemic educational issues: Hidden curriculum sabotages collaborative mindset.

Within the Situation/System and External Factors category a number of systemic causes for negative characteristics came up in the responses. There were mentions of systemic issues related to relentless technology change and the industry's dependence on it, and there were also perspectives on the systemic issues in the industry structure and the constant change required to chase changing markets. One of the most common topics was the misperceptions of the industry and specific jobs in the industry being convoluted with ego-myopic auteur expectations. The most common suggested cause was that misperceptions most likely came from mass media and the privileging and portrayal of games and mass consumer entertainment as exciting, glamorous and fun. Some respondents portrayed the game industry itself as uninterested in correcting such perceptions and suggested that more often than not the industry supported or promoted them. Mass marketing influences were seen as combining with gamers' lifelong experiences as consumers of games and media about games, competition in games, and socializing in game contexts that include blogging about games. As one interviewee put it,

games are the new movies in our culture. Because they are so steeped in it everyone has opinions and thinks they can direct films better than the filmmakers and gamers think they can direct (and also they think it will be fun, I tell my neighbour's kids it's 90% email and 10% meetings). And then they go to a school for a year and get more confidence. Most of the arrogance comes from the designers whom I work with most. It is a little bit of immaturity when they come right out of college. I don't know if you can do anything about this because they all think they have the best ideas for games. It's a combination of immaturity, ignorance, and a lack of experience. (Werner, 1:10:00)

The most prominent systemic cause interviewees brought up was centred on education. This could reasonably be expected since the interview was for an education dissertation, but it is an indicator of the degree to which developers hold education responsible and accountable for the quality of new recruits, and for employability gaps and negative characteristics. To begin with, at least six interviewees specifically mentioned educational practices derived from the ideology of individualism as sabotaging the critically needed characteristic of a collaborative mindset and abilities. Interviewees did not suggest any conscious or overt attempt to sabotage collaborative mindsets but instead described what is widely referred to as a hidden curriculum. Their examples included the structure of colleges and universities, which segregate students physically, socially, and intellectually in schools or departments, for example in science departments segregated from the arts and social sciences, and the socializing agents in those schools/departments/divisions/disciplines. Another example relates to educational practices supported by the ideology of autonomy and competition. In one interviewee's words,

There are no other real world situations where talking to your co-worker is cheating. Every other industry you work with others to solve problems ... but in education if they are helping each other out then it is wrong ... if students ask for help it is considered cheating ... in industry if you don't ask for help then you are an idiot, because there are always people there who have more experience than you. So novices sit and try instead of just asking. They lack collaborative mentality. (Qualopec, 1:14:00)

In addition to autonomy and competition, other concepts brought up by interviewees suggested systemic issues related to authority and entity theory. Game development is iterative and team members must constantly share their ongoing work. Whether finished or not, work must be monitored constantly and never taken off and finished in isolation, due to the great risk that it will not seamlessly slot back into the evolving pipeline, other assets, and the game. But contrary to this, in school students finish their work completely on their own and then turn it in as a polished finished work for assessment by others who will declare their work unacceptable,

average, or superior. “I don’t know if the education system can fix it ... but ... [education] needs to become more aware of the difference between education and assessment” (Qualopec, 13:52).

It is a common experience of students to anxiously await judgment often without a clue as to how they will be judged. The anxiety and fear of feeling judged is increased by culturally promoted fears of high-stake academic failure and parental pressure to excel.

In addition, North American social and educational systems tend to promote an entity theory of intelligence (Chickering & Reisser, 1993; Kuhn & Dean, 2004; Sternberg & Subotnik, 2006), which increases the fear of grading as a perceived pronouncement on the person (on their essential nature and identity). After twelve-plus years of training within this structure it is no wonder that graduates come to the work world resistant to showing work that is not complete and afraid of admitting gaps or failures. Qualopec saw the combined assessment and authority system as discriminating against self-awareness by not teaching self-assessment and promoting the idea of an external expert or authority that is required to judge students and their work. Students are not taught how to assess their own skills, work, and strengths and weaknesses.

A further problem related to the ideology of independent learners was brought up by a few interviewees in the context of the requirements of educational grading systems applied to the very few fully team projects that are included in curriculum. Generally speaking, schools can, at most, provide small simple projects, which is right off the bat very different from the realities of major game development teams which are dependent on sometimes hundreds of members, a huge pipeline, hierarchies, constraints, and personality clashes, all worsened by stressful critical conditions, especially during crunch-time. As well, on student teams each participant often does a few or perhaps only one job based on what they do well and can get a fair grade for. In such cases, students miss out on the opportunity to experiment with all aspects of production that

would help in rounding out their experience and would help to reduce another common and major novice gap, their holistic big-picture perspective. Educators and students alike were cited as accountable for the wasted opportunities of working in teams. A few interviewees had direct experience with student teams and one commented on how teams regularly dwindled to only a few or sometimes only one fully contributing person when the other students didn't get their game ideas adopted and/or saw no value in working on someone else's project. One interviewee emphasized that

[it is] a critical thing that needs to be said, it is teams that make games, not 1 or 2 individuals. So the whole thing about team dynamics with regards to being able to sell your ideas and at the same time being professional about it if nobody likes it. And be able to change it and go back and have the perseverance to make it better so everybody will like it. (Totec, 40:10)

Other interviewees talked about student team experience and how students would often be very good individually but not good at working on a team, and therefore educators had to deal with this critical need explicitly and “challenge students in every area they want them to be good at” (Pierre, 46:00).

Most interviewees mentioned a fear of judgment as a source of the negative characteristics of nonCommunication, resistance to inform others of problems, and resistance to share their work or ask for help, and as a major detriment to the collaborative work process. For instance, novices tend to have poor abilities in giving and receiving feedback. Some interviewees believed the education system tended not to be persistent and hard enough in the way feedback is given to students to prepare them for the realities of an industry that is iterative, blunt and harsh, and without room for ego attachment to one's work (Pausch, 2004). If accepted, this perspective challenges some common educational practices based on the objective of building self-esteem and raises questions about how to balance that goal while simultaneously training students to

effectively receive harsh and blunt industry assessment and feedback. Although I can see how perceived conflicts between these goals might exist, from my perspective there is no necessary duality in theory or practice. For instance, the use of methods such as NVC - Non Violent Communications (Rosenberg, 1999a, 1999b) could offer an alternative educational paradigm for building self-esteem while also preparing students for the realities and issues they will face in life and work. The NVC method can be used alone but NVC includes a theoretical perspective and a practice for effective behaviours in difficult situations requiring conflict resolution, assertiveness, and giving and receiving feedback. But since dealing effectively with people is not generally explicit and measured in the public educational curriculum, the probability that novices will arrive with the perspectives and skills for dealing effectively with difficult complex situations and unreasonable people is very small. This study, and employability research in general, identifies soft-skills as a gap for day-to-day work and life. One interviewee's advice to schools, given without hesitation, was that education should provide training in

people skills...totally across the board. I don't think that we are taught how to interact, how to connect. Especially in this day and age where we are a lot more disconnected, where there is a lot more social media, and we email as opposed to going over to talk to our colleague, we have msn instead of picking up the phone. I think that is a crucial key in how ... we have difficult conversations ... negotiate salary ... negotiate our career paths ... ask questions when we are feeling overwhelmed ... that would be a huge one. (Larson, 59:13)

As mentioned in previous chapters, there is significant research into the serious consequences from workers' inability and ignorance in how to have crucial conversations (Maxfield et al., 2005; Patterson, 2005).

Instructor hierarchy over students was another topic brought up as a system issue for game development education because both students and teachers are inculcated into what Shor calls *authority-dependency* (as referenced in Baxter Magolda, 1999). Authority-dependency is

one aspect of the education system's hidden curriculum that conditions participants in the assumption that learning is about listening to and obeying instructors who know the answers, and possess the grand narrative, including what is knowledge and what is important to know and be able to do. Baxter Magolda (1999) says that authority-dependency is learned and can be unlearned, but to transition to a new perspective "requires letting go of long-held assumptions about knowledge, authority, learning, and self" (p. 257). Qualopec made a similar point when he said

what's interesting about real science or real game development is that people don't know the answers, and there aren't any answers, or at least not that anybody knows or has really figured out [But] you train people for years in their undergraduate degree that if there is a question it has an answer, and there is a right answer, and I'm supposed to know it. And then you put them in a situation where there's a question and they don't know the answer and they assume it's because they haven't done the right stuff or they haven't tried hard enough, when in actual fact it's because nobody knows the answer. And they get no exposure to that, certainly not in an undergraduate degree Real science and real game development has questions that no one knows the answer to. (Qualopec, 1:22:30)

I would add that complex environments are also partially defined as having questions that no one knows the answer to. From a pragmatic perspective a major educational goal would be to foster an experimental approach to personal epistemology that would include a perspective expressed by Amelia: "schools should teach that failure is an important part of creative success and not that there is a right or wrong" (25:33). This is also a major theme of Seth Godin's (2010) book *Linchpin* which was recommended by Pierre.

The resistance to vocational programs in higher education that was mentioned in Chapter 1 as a potential systemic issue was very evident in the perspectives of both academics and students who attended game programs at universities. One interviewee, Jerome, exemplifies the university side of the issue from a student perspective. His perception is that the program did not prepare him or any of his classmates at all for entry into the industry. He said that the school and

the program were conflicted and confused and that the faculty were divided on the issue of technical skills and partnerships with industry. He wanted to leave but got entangled in administrative and other issues that kept him in the program. Three other interviewees all mentioned the same conflicts and confusion at their universities. Two of these participants were university administrators. Yarofev, another senior university faculty interviewee (non-industry), expressed his belief that university is about educating people to think, not to train them for work, and that industries say they want and need educated people but in a pinch they want worker bees.

In response to questions about how their program was initially developed the educational interviewees indicated that little thought and attention was put into objectives and outcomes of game programs at universities, even though they and their institutions state that this is critical to program/curriculum development. There was a noticeable level of self-consciousness or perhaps embarrassment over this fact by Charles and Patrick. Yarofev added that the lack of clear academic objectives and outcomes was especially prevalent in institutions in which so called game programs had been created to boost enrolment in dying computer science programs (Morrison & Preston, 2009). Charles, Patrick, and Yarofev gave evidence to the position that the lack of holistic program objectives and outcomes in curriculum development is at least partly due to legacy structure and ideologies of the university system. Within the faculty, champions emerged or were solicited to lead the program development and, depending on the faculty perspectives, there could be numerous informal objectives. But in the case of Charles and Patrick the objectives and outcomes were never formalized. No one ever sat down and decided what the outcomes were going to be. Individual class outcomes were decided by the instructors, but the program did not have outcomes. For various reasons, including being forced into addressing this problem by having to do program assessments, both universities are now starting to address

program objectives and outcomes. In the case of one of these universities, when a game specialization was added to the computer science program there were no resources, so no new instructors were hired and existing classes were used as much as possible so that new courses would not have to be created. As well, no industry reviews have ever been done.

Table 19 presents the averages of interviewee perspectives on their educational institution’s objectives and outcomes. Interviewees’ roles in relationship to the institution

Table 19: Institution & Program Clarity & Confidence Ratings												
S= Student I= Instructor A= Admin							Program Objectives & Outcomes			Outcomes are Relevant, Necessary, Complete		
	S	I	A									
Avg # Responses	4.5	7	6									
Average Rating	4.5	3.6	4.6									
	Institution Philosophy			Program Philosophy			Program Objectives & Outcomes			Outcomes are Relevant, Necessary, Complete		
Average Rating	4.04			4.49			4.86			3.63		
	S	I	A	S	I	A	S	I	A	S	I	A
	4.2	3.4	4.5	4.6	3.7	5.2	5.0	4.6	5.0	4.3	2.7	3.8
High Rating	6.0	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Low Rating	1.0	1.0	3.0	3.0	1.0	4.0	3.0	1.0	3.0	3.0	1.0	1.0
# of Responses	5.0	7.0	6.0	5.0	7.0	6.0	5.0	7.0	6.0	3.0	7.0	6.0

included students/graduates, teachers, curriculum developers, and advisors. Of the respondents there were sixteen who were involved in education for game development or an equivalent area such as 3D animation for entertainment-arts. Eight of those involved in education were teachers and all created their own curriculum, and eight were involved at the administrative level and played key roles in developing their institution’s game development programs and curriculum. Two of the administrative level participants (Charles and Kristina) were full-time university faculty and championed their university game programs, and a third (Gianni) was involved full-time in private college administration. Interviewees were asked to articulate their perception of the program objectives and then to rate their level of clarity or confidence that their perception is

accurate on a scale from 0-6 with 0 being absolutely no clarity or confidence and 6 being completely clear and confident.

It was expected that because administrators were involved in the game development programs at their institution and even were the champions and developers of the programs, they would have the highest clarity/confidence. Instructors were expected to fall between the administrators and students. Instead, the instructors had the lowest clarity and confidence for all areas, and students were quite close to administrators except for the confidence that outcomes are relevant, necessary and complete. In relation to that confidence rating students were actually the most confident, above the administrators, and the instructors were the lowest. There were only three students who felt they could even answer the question, though. Four of the seven instructors were actually pretty confident that the program content wasn't relevant, necessary, or complete, and about half of the administrators aligned similarly. All the administrators said the programs were evolving and improving but had a long way to go.

Jerome reported from a student perspective that they were pretty confident (Level 4 on the 1-6 scale) that the university wanted to produce avant-garde, outside-of-the-box thinkers in the fine arts, and students who wanted a job could go to a technical college. But Jerome reported that the institution recently began getting involved with industry and vocational needs and this created confusion and conflict inside the institution and among the faculty. Students were caught in the middle. Both their reputation within the program and their marks could suffer if they were perceived as too commercial by instructors and peers. This made it tough on the students because in order to get a job they needed to demonstrate commerciality. A similar situation was occurring at another university where Kristina, an MA student with clear personal educational objectives, felt a lack of institutional guidance and direction because the faculty were divided and conflicted

over the program objectives and outcomes. When the institution partnered with a large game developer Kristina perceived that the program gained significantly more focus, but that focus was at the expense of the faculty that opposed any corporate infiltration, opposed vocational or production oriented training, and rejected any hint of the program being about making games.

Patrick (administrator/developer) reported that a lot of students were frustrated to find out from industry reps after being in their game design program for a few semesters that graduates from the program would not qualify for work in the industry. They would have to switch fields, or take additional outside courses, or switch schools. Game companies were reported by interviewees as also being frustrated with this type of situation because their staff wastes time reviewing applications only to find out later that the applicants are not qualified. According to Patrick it is common for university graduates to apply for game designer positions, based on their belief that their degree in game design or development qualifies them, when at best their education might qualify them as a general artist. This situation is a source of some serious friction between the industry and academia and is clearly related to the negative novice characteristics of naivety, misperceptions, and unrealistic expectations regarding industry and job realities.

Interview Question #3: Perception of Ideal Behaviours

Table 20: Situations In Which Negative Characteristics Commonly Present	
Category	# of references (64)
A. Relations & Conflicts	14
B. Self-Management & Work Ethics Within a Team	14
C. Industry & Business Realities	10
D. Naivety Issues (lack of experience and holistic perspective)	10
E. Inadequate Communication	9
F. The High Pressure Context of Situations	7

Note. A collation of situations is in Appendix 2

After discussing with interviewees how novices commonly handle situations, the question was raised as to how an ideal novice or ideal employee or expert or veteran might handle the same situations. In many cases the effective behaviour was simply the opposite of the negative behaviour. For example, a situation was described in which a person receives an asset that doesn't work but instead of bringing the issue up with whomever is accountable, the person fixes or changes it themselves and doesn't report it. The ideal behaviour is simply to bring it up to the person who is accountable; if they do fix it themselves, they must report it.

The primary purpose in soliciting situations was to add further depth and insight for the interviewer and interviewee into the perceptions of negative characteristics and ideal behaviours. Therefore, the links between negative characteristics, causes, situations, and ideal behaviours were mapped. It turned out that there were only seven situations that could be directly referenced to a previously given negative characteristic. Those are presented in Table 21 (S3, S4, S6, J2, M1, Sh2, L2) and provide a picture of the perceptual relationships and how the summaries evolved. The rest of the situations had multiple negative characteristics associated with them and/or, as per the intention of increasing depth, additional negative and ideal characteristics / behaviours came up or distinctions and elaborations on other characteristics were made. The ideal behaviours given for the situations were collated with all other references to ideal behaviours and then categorized (for later comparison with expert characteristics). See Appendix 2: Situation Summary List for a collated summarized list of situations.

Table 21: Negative Characteristic-Cause-Situation-Ideal Behaviour	
Neg = Negative Characteristic Cau = Cause Sit = Situation Elb = Elaboration IB = Ideal Behaviour VEB = Veteran/Expert Behaviour FIC = Researcher Final Ideal Characteristic	
Situation S3	
Neg	Insecurity - sneaky, etiquette, missing common sense.
Cau	Upbringing.
Sit	A lead (l) gets jealous or suspicious (lack of trust) and hassles the worker (w). The lead poses as someone's manager and gets private information, which is a major infraction.
IB	Continue to work hard, don't get feelings hurt, learn from the experience Go the appropriate position/hierarchy level and then let them handle it (not HR who assigned (l) the job, maybe to labour board). Take himself out of the situation.
VEB	No difference.
Elb	Paying dues includes understanding the chain of command and getting to know and learning from your team, but not treating others poorly because you were treated poorly. It is often hard to see these things until they explode, and people crack under pressure.
FIC	Get to know team and chain of command, learn from team.
Situation S4	
Neg	Lack of communication.
Cau	Lack of experience.
Sit	A person is handed off work from another team member that is inadequate but instead of bringing it up to whomever is accountable, the person fixes/changes it themselves and doesn't report it.
IB	Simple communication. Should have asked other to fix it and/or notify supervisor that this code needs to be fixed. Not naming, not calling out the other person and let the chain of command deal with it.
Elb	Essential to know how to get cooperation without force.
FIC	Get cooperation without force.
Situation S6	
Neg	Don't use expected etiquette (ignorant of hierarchy, policies, procedures, politics).
Cau	Lack of experience & proving.
Sit	Cliques tend to form by area, team, and hierarchy. When someone knows (is friends with) higher ups or non-group members, and especially if they switch clans, it can cause ill feelings.
IB	A novice should first go to their supervisor and ask (but he is just going to do the political thing). If worker is getting really caught up in it, then the worker could be sent to HR. A good supervisor can listen but may need to send them to HR.
VEB	Just keep quiet with a smile on face. Sit and listen and not let it affect you since it is just a rumour. If it starts to affect work then speak to HR.
Elb	There are always a lot of rumours and people start panicking, and then they try to align with people so that they can make their jobs more secure. If the rumour is true, the supervisor must hold the company line and be a politician.
FIC	Not let it affect you. If it starts to affect work then speak to HR.

(Table 21 continued)	
Situation J2	
Neg	Communication (lack assertive ability).
Sit	Dealing with a higher-up. Team members will at times have to deal with a Director. They will have to know what is appropriate to bother them about and how to talk to them. They must know the pipeline and where they and the director fit into it. For instance, they wouldn't ask Directors about technical problems.
IB	You also have to see the whole, so you have to get out of your desk and interact and say, I have this section after yours, how should this character act. Are you going to be the shy animator or are you going to go and ask. Must be loud enough to get what you need but not so much that you are getting too much attention, in the least intrusive manner possible, and the opposite of arrogance is being too quiet and flying under the radar all the time. Some animators can be great but they are too quiet and fly under the radar and never get noticed, especially in a big company, so they don't get to be senior animator, etc.
VEB	A more seasoned animator would be able to get the appropriate attention. Knowing what is relevant to them relative to you.
FIC	See the whole, physically interact and co-create with the team and be sure needs and integration are clear. Go and ask. Be appropriately assertive. Find out what is relevant and appropriate in the hierarchy.
Situation M1	
Neg	Don't do research.
Cau	Lack drive or ambition [not self-directed].
Sit	It is the responsibility of the artist (though mostly of the lead artist) to ask questions to find out the big picture use and needs of an asset. Base models must account for everything the model will need to do in the game. So for instance in a boxing game, the base meshes must be able to handle impact, bruises, cuts, etc. If a base head is not made well, every character after that will have problems and that would mean going back and fixing every single character.
IB	We have technical artists to handle the workflow, so the novice should talk to the technical artist and/or other people on the team.
FIC	Find out who to go to for what and do it - talk to the team.
Situation Sh2	
Neg	Won't speak up or ask.
Cau	Innate shyness.
Sit	Novices run into problems on a task but are often afraid to speak up or butt into conversations or ask. The consequences of this behaviour show up at the end of a timeline when it can't be hidden anymore. Then others have to make up for the novice's mistakes and bad vibes happen. It can become cyclic because then next time the novices are even more afraid to say anything.
IB	No one wants to be bugged all the time but there should be good communications and it is in everyone's interest to get them up to speed. And as long as they are the type of person that learns from their mistakes or that learns what the work around is for next time then after they have been taught they shouldn't need to be taught again.
FIC	Learn from mistakes, learn the work around so don't need to be taught again.

(Table 21 continued)	
Situation L2 (2 situations related to being unprepared, entitlement causes, & high expectations)	
Neg	Unprepared for industry realities: autonomy, deliverables (time management), work ethic, lack of holistic perspective, impatience
Sit	Students perceive some task as mundane relative to their skill set and don't give 100%.
Cau	Entitlement generation.
IB	They must pay their dues and earn recognition as a team player.
Sit	An opportunity for recent grads comes up but because they have sent their resume to PIXAR they don't bother with these other opportunities when Pixar may call any day. They don't make an assessment of where they are in their career and the odds of actually being able to build up experiences enough to be attractive to Pixar, and timing a strategy for success. A Pixar recruiter recently said that he deals with about 20-60k resumes a year. So what are the odds? And when they think about the game industry they are naturally going to think about the big or prestigious companies (EA, Radical, Activision, Rock Stars) but everyone else is thinking the same thing [competition is great].
Cau	It is sort of beating down a high expectation level that has been instilled in them. At Siggraph this year I talked to a number of educators, not from North America, but whether from Asia or Europe, it's a common problem. Patience factor vs. instant gratification. And I think it is because everything is so globalized right now, they are all watching the same programs you referred to, and so those concepts are out there, whether it is in their culture or not. Even an international student to Vancouver you could be facing those same [entitlement] complaints.
IB	...beating down a high expectation level. Of the things that needs to be instilled in these folks, and I think it is doable, is to revive the art of craftsmanship, of really getting involved in understanding the process and being very patient with the process and looking at creating the best possible product for any given task.
FIC	Craftsman attitude, get involved in understanding the process and being very patient with it and create the best possible product for any given task

Perception of ideal employee characteristics. Responses to the questions on *ideal behaviour* and *ideal employee perception differences between management and production* were combined, extracted to the spreadsheet and aligned with the case so that their response to negative characteristics, causes, and situations could be compared and used to improve validity of the interpretations of the ideal behaviours and the categories used for them. References longer than a sentence or two were condensed or summarized and the summary points were exported to a Word document and grouped by same or similar words and ideas, and then into themes. Category wording and definitions, as well as coding of individual responses were iteratively changed until the changes were considered not to be making a significant improvement in the

description or model, and all responses fit within a category. Vague responses were referenced back to the situation, causes, and negative characteristic summaries, or back farther to the transcripts, or all the way back to the audio files for clues to meaning. A few responses clearly integrated multiple themes or a holistic perspective so instead of separating the themes out the whole response was copied into multiple categories to maintain the integrated/holistic theme. Here are some examples of references with categories that they were considered to relate to in brackets:

- anticipate what needs to be done and take action
[Holistic Perspective and Self-Motivated Self-Management (SMSM)]
- realistic perspective driven by passion that fuels perseverance and striving for excellence
[Holistic Perspective, SMSM, Enthusiastic 100% Participator (E100%)]
- passion, authentic excitement as an indicator of learner and perseverance through tough times and challenges
[Holistic Perspective, SMSM, E100%, Delivers Results: Reliable Accountable Productivity (DR), Self-Aware Openness]
- innovate and add value
[Holistic Perspective, SMSM, DR]
- job competence in context of big picture and dependencies
[Holistic Perspective, SMSM, DR].

Once the categories were solidified, the number of references within each subcategory were summed to establish a hierarchy. The hierarchy is not intended to be statistically accurate. For one thing, the hierarchy count was skewed by interviewee verbosity in which some interviewees used many references to similar ideas and others used very few words. This was accounted for to some degree by doing a separate count of the categories mentioned by each interviewee and counting the total number of interviewees that mentioned a category rather than the number of references per category. The rankings came out essentially the same for the top six of nine categories. The category Technical Competence came up seventh instead of ninth in the

interviewee use count, but it is not considered significant because it could have been removed entirely due to the fact that it was discussed with interviewees that technical competence was considered a given in the industry for the purposes of this study. This is a reasonable assumption based on a common cultural expectation that technical ability to perform a job is an unquestioned minimum hiring qualification. Companies in North America hire people with the required technical skills for the job, for example programming skills for a programming position. This assumption was confirmed in conversation with each interviewee before launching into the interview questions. Totec sums up the perspective when he says that there is a “baseline [of technical skills] that everyone has to pass or they wouldn’t have been hired to begin with” (18:00). Interestingly, though, when asked if most post-secondary graduates would be able to pass that baseline he responded with a “No” and said that graduates fall short of the baseline in all areas, that is to say both hard and soft skills.

With respect to my subjectivity in categorizing references, there was a continuum of characteristics from the obvious and clear, for instance references such as “team fit” and “relate to team members positively like friends” to the characteristics that could apply to almost any category. For instance, the reference *confidence* could be related to perceptions of others in social and collaborative interaction, self-awareness, level and clarity of self-initiated behaviour, and others. In the case of *confidence* the categorization was sometimes clear from the context of its use, for instance when it was used to describe a novice who doesn’t allow fear or shyness to prevent them from participating in the team and asking the team questions and help when needed. But for other interviewees it was mentioned within a list of attributes that were not contextualized and so the category assignment was an educated guess based on other aspects of the interviewee’s responses. For example, the phrase “deep knowledge of subject area” (Pierre,

36:00) was used by an interviewee who tended to focus on technical skills and, therefore, this phrase was considered to refer more to technical competence than to holistic perspective.

The ranking of categories therefore was intended as an exploratory framework for considering what themes were most often mentioned and therefore might be considered to have higher cross-case relevance. Some themes were clearly more often mentioned than others and therefore deserved the higher ranking. The three lowest ranking categories are much less clear as to their relative position, but it is still clear that they were mentioned far less often. Table 22 presents the ranked categories with some descriptive examples and Table 23 presents the percentages for ranked categories for the two different counts where it can be seen that there was no more than a two percent point difference between any of the category rankings. Content from the Negative Characteristics table is duplicated in condensed form in Table 24 for convenience in comparing them to the Ideal Characteristics.

Table 22: Ideal Characteristics	
Ideal Characteristics	Examples of descriptive attributes
A - Social and Collaborative Effectiveness	aware participation, interpersonal social skills, trusting & trustworthy, supportive, empathetic, humble confidence, communication, assertiveness
B - Self-Motivated Self-Management	organized, dependable, quick learner
C - Enthusiastic 100% Participator (Passionate Commitment)	passion, adding value, high performance standards
D – Personableness	communicator, fun, pleasant, nurturing, empathetic, doesn't get offended, no ego, cooperative
E - Self-Aware Openness	humbleness, honesty, open to feedback and personal change
F - Holistic Perspective	includes aware seeking of big picture context for job to industry and life for decisions
G - Delivers Results: Reliable Accountable Productivity (The Business)	focused drive, hard work, little supervision, hits deadlines
H - Talent & Creativity	super talented, creative, open, experiments to improve
I - Technical Competence	technical/specialized skill, deep knowledge of subject, competence in holistic context

Table 23: Ideal Characteristics. # of References & # of Cases With >0 References				
Ideal Characteristics	#Refs	%	#cases	%
A - Social and Collaborative Effectiveness	36	23%	12	21%
B - Self-Motivated Self-Management	25	16%	10	17%
C - Enthusiastic 100% Participator (Passionate commitment)	24	15%	8	14%
D – Personableness	23	15%	7	12%
E - Self-Aware Openness	14	9%	6	10%
F - Holistic Perspective	12	8%	5	9%
G - Delivers Results: Reliable Accountable Productivity	8	5%	3	5%
H - Talent & Creativity	9	6%	2	3%
I - Technical Competence	7	4%	5	9%

Table 24: Negative Characteristics: Disrupt Relations and Productivity (Condensed From Table 14)		%	%
Cp	Poor Communication [cp = (10) references]	9%	42%
Cf	misFit (Primarily due to poor interpersonal/social behaviours) (9)	8%	
Ce	Superiority, Entitlement, Ego Myopic (9)	8%	
Cc	Non-Collaborative (9)	8%	
Cd	Defensive (7)	6%	
Ca	Antisocial (3)	3%	
Cn	Non-Accountable (2)	2%	
(Table 24: Negative Characteristics continued)		%	%
Wp	Poor Work Habits		22%
We	Lax Work Ethic, <100% Work Effort (12)	10%	
Wi	Non-Initiating (8)	7%	
Wo	Unorganized (5)	4%	
H	Holistic MetaPerspective Gaps (a lack of awareness and perspective)(42)		36%

One clear difference in the ideal characteristics categories compared to negative characteristics is the far lower percentage of references to a holistic perspective as an ideal characteristic (8%) versus a lack of holistic perspective as a negative characteristic (28%). The lack of holistic perspective was deemed pervasive enough in the analysis of negative characteristic references to be presented as a metacategory that informed and impacted the other negative characteristic categories. The fewer references associated with a holistic perspective in the ideal characteristics might be nothing more than categorizing differences, for example

interviewee perspectives may include a holistic aspect that would have shown up if the references were investigated more thoroughly or categories were defined more subtly. But because both a holistic perspective and tacit expertise in complex environments can be seen, by definition, as informed through a broad spectrum of experiences, extended connections, knowledge claims, and conflicting perspectives, it seems more probable that the difference reflects a figure-ground effect. Various aspects of the interviewee's tacit expertise could have been brought into the foreground by the request to reflect on novice issues. These would be identified as issues because they clashed with tacit-intuitive common sense, or perhaps better described as tacit holistic sensibilities. But ideal employee characteristics would not clash, but rather be perceived upon the ground of tacit-holistic sensibilities and therefore, as part of the ground, be less objectified and foregrounded. Evidence that many perceptions were tacit surfaced in verbal and bodily responses where effortful reflective thought was evident and people said that it was interesting for them to make explicit what they knew and thought but never before had verbalized or thought through. Although pointing out the obvious, it should be kept in mind that the term holistic comes from the researcher's categorization label intended to catch the flavour or sense of many responses and that interviewees themselves seldom used it.

In considering the relationship between the perceptions of Negative Characteristics and Ideal Characteristics I believed it highly probable that there would be separate cognitive models for the concepts and that therefore no necessary relationship was expected. The primary responses coded for each topic arose out of different questions and different contexts. But apples and oranges are still comparable as fruit, and since both sets of characteristics were positioned in reference to successful veteran expertise in the game industry (for example, common negative characteristics that need to be overcome to be successful), there is also a high probability of

some correlation between most or at least some of the concepts. It turns out that there were a number of clear category and content similarities. For instance, Social and Collaborative Effectiveness is clearly related to the negative characteristic category Poor Communication and all of its subcategories: misFit; Superiority, Entitlement, Ego Myopic; and Defensive, Antisocial, Non-Collaborative, and Non-Accountable, because these behaviours disrupt social and collaborative effectiveness. Similarly, the Self-Motivated Self-Management category is related to Poor Work Habits, most clearly Non-Initiating behaviours but to a lesser extent perceptions of Lax Work Ethics, <100% Work Effort, and Unorganization. The ideal characteristics of Enthusiastic 100% Participator... and Personableness are related to misFit, Superiority, Entitlement, Ego Myopic, and Non-Collaborative because these would prevent collaborative participation. Self-Aware Openness is clearly related to Holistic MetaPerspective Gaps (a lack of awareness and perspective), and less clearly related to the Poor Communication category because lack of self-awareness was seen as a cause of poor communication. Holistic Perspective is obviously related to Holistic MetaPerspective and less clearly or less directly related to other characteristics such as Unorganized because of the perception that a lack of holistic perspective and knowledge prevented many ideal behaviours such as foreseeing future needs and planning, which are related to organization. Delivers Results: Reliable Accountable Productivity (The Business) is fairly clearly related to Non-Initiating behaviours and to a lesser extent perceptions of Lax Work Ethics, <100% Work Effort, and Unorganization.

Stepping back and looking at key themes and concepts that emerged based on the number and intensity of references, the category results can be seen as two ends of a spectrum from novice (in training) to ideal employee (arrived), dysfunctions to functions, undesirable to desirable, necessary to highly desirable. The key values and needs that were perceived as

necessary to be addressed with novices were: 1) collaboration and fit, 2) expertise development, 3) adding value to the business, and 4) a base level of technical skills and talent (though a high level of either or both is all the more desirable). The ideal characteristic of Social and Collaborative Effectiveness is clearly necessary for collaboration as are good communication skills and awareness. Personableness is necessary for fit with the team. Self-Aware Openness is needed for the successful and deliberate (reflective) acquisition of expertise along with other characteristics such as a holistic perspective and self-management. Delivers Results: Reliable Accountable Productivity is a key aspect of what management is looking for in an employee and therefore for adding value to the business and being successful within the business context. One management interviewee summed up this perspective nicely: “The team is looking for the fit ... priority one.... HR, me and my executive producer, are looking for a body that is the best for the job” (Werner, 1:18:03). Finally, a base level of technical competence and talent is clearly necessary for any job and exceptional talent is a highly valued added value, though not at the expense of collaboration or fit.

These perceptions were considered for specific key stakeholders that were referenced in the interviews: the production team members, the novice (desiring to become a successful industry veteran expert), the company and management, and students and schools. Table 25 presents key themes for the stakeholders that came out of the research and Table 26 maps the relationship between stakeholder key values and the related ideal and negative characteristics. Table 25 graphically reflects why game employers (and many other industries) may have consistent complaints about the inadequacy of graduates or novices. Vocational programs and students typically focus only on the entry-level skills as keys to unlock what they rightly perceive as the door into the industry and their primary barrier. But it is only an initial entry

Table 25: Key Values of Stakeholders	
Stakeholders	Key Value, Desire, Or Need
Production Team	Collaboration and Fit (competence is assumed)
Company Management	Productive & Timely (adding business value)
Team Member	Acquiring Expertise, Fulfilling Passion
Job Requirements (student & vocational program focus)	Entry-Level Skills & Talent

Table 26: Stakeholder Values and Related Ideal and Negative Characteristics			
T=Team M=Management/Business TM=Team Member J= Entry Job Requirements			
Stakeholders Key Values/Desire/Need		Ideal Characteristics	Negative Characteristics
T	Collaboration and Fit	Social ...Effectiveness Personableness	Poor Communication misFit (Primarily due to poor interpersonal/social behaviours)
M	Productive and Timely (adding business value)	Self-Motivated/ Managed Enthusiastic... Delivers...	Poor Work Habits
T M	Acquiring Expertise, Fulfilling Passion	Self-Aware Openness Holistic Perspective	Holistic MetaPerspective Gaps (a lack of awareness and perspective)
J	Entry-Level Skills & Talent	Technical Skills... Talent...	

point. They don't see that on the other side of the door is a whole new complex and often chaotic world in which the players (stakeholders) desire, value, and need other skills and characteristics far harder to acquire than the entry-level keys were. Since these skills and characteristics are not taught, and often are not even clearly articulated or understood, success in the industry is largely a random chance game based on factors such as upbringing and genetic predisposition (as per the interviewee perceptions). Genetic predisposition includes personality types and levels of talent in specific relevant areas that may advantage some people with higher initial ability levels, predilections, and acquisition strengths. As previously discussed and referenced expertise research tends to view the genetic starting points, for instance the concept of innate talent or intelligence, as minor factors in long-term success for the vast majority of people. But the common-sense folk wisdom - that genetic starting points are major factors (or *the* major factors)

- is supported and propagated by a conflicted educational and socio-cultural system. For universities that do prepare grads with some of the skills for long-term industry success, such as following their passion, learning to learn and acquiring expertise, or being productive, they often don't teach the entry-level base need skills. And according to the interviewees in this study the education system tends to undermine collaborative mindsets rather than simply inadequately prepare for collaboration. Finally, there is very little empirical research or data on how best to integrate hard and soft skills for specific results (Turner, 2004) and education has a long way to go in mastering that aspect of education.

Interview Question #4: Perception of Expert Characteristics

Table 27: Perception of Expert Characteristics	
EA	Awareness of Self & Others (applied to interpersonal & team communication & relations)
EA1	Build Nurture and Manage Relationships
EA2	Unpretentious Open Self-Awareness (used to support & motivate & grow)
EA3	Collaboration
EA4	Communication and Rapport (across disciplines and personalities)
EB	Holistic
EB1	Holistic Broad & Deep Foundation (for problem solving & decisions in complex situations)
EB2	Problem Solving & Decision Making
EC	Passion for Profession (that acts as fuel)
EC1	Committed Perseverance (in the pursuit of excellence)
EC2	Lifelong learning & Adapting to Change
ED	Professional Demeanour
ED1	Appropriate Professional Work Ethic & Values
ED2	Calm and Confident in Stressful Situations
ED3	Self-Managed and Self-Directed

All interviewees were asked for the top three to five characteristics that distinguished experts and/or successful veterans. Relative to other interview questions, the responses describing expert characteristics had many more complex and integrated themes. Although this

made categorization more difficult, the process of coding was basically the same as for other questions. The following example may help to provide a sense of the process.

One interviewee's first-named characteristic was "attitude." But it was not clear if it was meant as a single category with further descriptions of the category, or if it was a generic heading with a list of different characteristics. Here are her words:

the first one at the top of my list is attitude ... their persona ... the industry in general, it's really attitude, and you get the span of the eccentrics to the genius ... very creative people, and very happy-go-lucky, that's a great thing, and often people are very easy going to work with, if you're talking about the general consensus of the population they all understand that to get anything done you have to work with people, so they are very friendly individuals. The second is, and it kind of goes with the first, is they have the creative mind-sets. Visionary. And I hesitate to say this but what I've found in the past is, was, that those who dressed creatively they were also the best, especially in their arts, like animators ... they dress very creatively, very trendy but... (Jacqueline, 13:29)

Later I went back to her use of the term "attitude" and asked her what specific characteristics she was referring to. It was often the case that people would identify a category or characteristic and would develop clarity about it as they proceeded to describe and define it.

Well it's a *can do* type of attitude. You give them a task and they will tackle it, they will ... go to the end of the earth to do it. You just set a goal and they are able to distinctively finish through, follow through ... you know what it is, it is actually discipline ... disciplined, very disciplined in mind, and they can sit down and really push through....'cause it's a long production cycle, and I'm amazed at how people for two years can sit there and really focus and get it, you know, within high pressure zones, and they are able to push through and get it all done. That just goes to show the kind of passion that they display. But it's the *can do* ... it's like ... sometimes they even go beyond the call of duty and pull off the impossible. I've seen that happen a couple of times. We're in a meeting we're discussing something and then all of a sudden, you get out of the meeting and the guy's like, I've done it ... you know it's again, it's the element of surprise, and again perseverance. (Jacqueline, 17:19)

So, out of this description of attitude came:

- eccentrics to the genius
- creative
- happy-go-lucky

- easy-going to work with
- understand the need to work with people
- friendly...“can do” attitude
- take on and achieve goals
- follow through
- discipline
- discipline of mind: stay focused over a long period (two years) in high pressure situations
- go beyond the call of duty
- pull off the impossible
- get results
- passion
- perseverance [fuelled by passion]
- surprise people with what they accomplish

In order to code this I had to decide whether in her mind the characteristic of *attitude* was a single broad item that centred on discipline, or if it was a generic category that contained many ideas, or whether it was a single category that just took time for her to arrive at. If the latter, that would mean that the various ideas she brought up in the process were placeholders within the process of her thinking. Based on the whole context I decided that the general approach I had followed for the other questions was appropriate and I split out the individual ideas then grouped them per their internal similarities. Therefore *attitude* was not treated as a characteristic but as a number of characteristics that were split out and grouped separately in an iterative process, which included trying to identify a category heading that described the primary attribute of the

grouping. The grouping process continued until the grouped responses all had at least one key element in common and in which no primary group had less than about four or five items. This seemed the best strategy for representing the respondents' perceptions by retaining all or nearly all of their words and concepts, organizing them by internal consistency rather than externally derived categories, and thus retaining perceptual nuances, but keeping in mind that they were also perceptually associated in some (rather complex) way.

After the initial groupings were complete for the direct responses to the expertise question, the sources were reviewed again for additional allusions and references to characteristics of experts and successful seasoned veterans. These secondary source references came mostly from responses regarding 1) expertise that the respondent had mastered or was weak in, 2) if there was a difference in the perception of an ideal employee for management versus production teams, 3) the process and standards used for hiring decisions, 4) ideal behaviours in situations mentioned, and 5) the inverse of negative novice characteristics. Responses were collated, grouped, and categorized separately from the responses to the main expertise question and then the categories were compared. The main categories weren't initially used since it was not assumed they would be the similar. After comparing the categories the secondary source references were switched to the main categories because both categories were close enough that nothing would be lost by making the change and the main categories were more comprehensive.

In both the direct and indirect references, the awareness category clearly had the most content. Within the awareness subcategories, Communication... and Build...Relationships were reversed for first and fourth (first and last) in content ranking. The holistic category was second in the direct reference positions but was fourth in the indirect references. Since the passion and

Table 28: Expert Characteristics Percentages		Within category counts					All Responses	
	A - Awareness of Self & Others (applied to interpersonal & team communication & relations)	Direct		Rank	Indirect		Direct %	Indirect %
EA			%	1-1	%			
EA1	Build, Nurture and Manage Relationships	19	45	1-2	18	8	16	9
EA2	Unpretentious Open Self-Awareness (used to support & motivate & grow)	8	19	2a-3	13	6	7	7
EA3	Collaboration	8	19	2b-4	11	5	7	6
EA4	Communication and Rapport (across disciplines and personalities)	7	17	3-1	58	26	6	30
	Totals and %	42	34		52	45	34	52
EB	B – Holistic			2-4				
EB1	Holistic Broad & Deep Foundation (for problem solving & decisions in complex situations)	17	57	1-1	89	8	14	9
EB2	Problem Solving & Decision Making	13	43	2-2	11	1	11	1
	Totals and %	30	25		10	9	25	10
EC	C - Passion for Profession (that acts as fuel)			3a-3				
EC1	Committed Perseverance (in the pursuit of excellence)	16	64	1-1	82	9	13	10
EC2	Lifelong Learning & Adapting to Change	9	36	2-2	18	2	7	2
EC3	Totals and %	25	20		13	11	20	13
ED	D - Professional Demeanour			3b-2				
ED1	Appropriate professional Work Ethic & Values	9	36	1a-2	32	7	7	8
ED2	Calm and Confident in Stressful Situations	9	36	1b-3	0		7	0
ED3	Self-Managed and Self-Directed	7	28	2-1	68	15	6	17
	Totals and %	25	20		25	22	20	25
	Total counts for all categories	122			87			

professional categories were tied for third position in the direct references there was no real ranking difference to note. Overall the percentage differences for the indirect references have greater variance and spread as compared to the direct references. The indirect references also have a greater number of references in the awareness category and less in the holistic and

passion categories. These differences were considered small and no deeper exploration was pursued. As was the case for other questions, the secondary sources and the rankings were intended as supplemental information and checks for potential major discrepancies and not as statistical analysis.

The four main expert characteristic categories (Table 27 and Table 28) are Awareness of Self & Others (applied to interpersonal & team communication & relations), Holistic, Passion for Profession (that acts as fuel), and Professional Demeanour. The longer category titles reflect the more complex and multivariate integrated concepts within the references and point to holism as a metacharacteristic of expertise (irrespective of also having a specific holistic category).

Professionalism surfaced as a category heading in the first few iterations of the Ideal Characteristics categories. It was labeled as Professionalism: Commitment to Values of Industry, Company/Team, Discipline, Society, (tot references =32) with the subcategories Enthusiastic 100% Participator (Passionate commitment) (24 references); and Delivers Results: Reliable Accountable Productivity (The Business) (8 references). The subcategories were later used instead of the single category but from the ideal characteristic references the following description emerged for the category and works for professionalism as it is used here: professionalism is characterized by a commitment to an identifiable higher calling, standard, or purpose than simply working for money, for example a dedication and commitment to the mission and vision of a profession. That commitment flows to operational specifics such as the company and team and position.

Applicationally and functionally the category EA1 is about masterful management of relationships to achieve goals, stay on track and accomplish great things. Some of the alternative labels that were considered for this category were interpersonal skills, managing relationships,

and social and emotional intelligence. But these all seemed to miss the spirit of the references that leaned decidedly towards an authentic desire to contribute, to higher visions and missions, and to professionalism as previously defined, in distinction to selfish interest and/or manipulation. The tone is not altruistic per se but is certainly collaborative in the pursuit of a common good and includes not just sensitivity to interpersonal and social variables but also self-aware empathy associated with self-actualization. This tone is evident in all of the expert characteristics categories and not just EA. Therefore, Awareness was chosen as a theme for the first main category to imply this higher-level meta-awareness of self and others that informs decisions and actions and vision, and to reflect personal and social awareness as a prerequisite to creating the types of relationships being referred to by interviewees.

Leadership was another clear and related theme in the responses. Based on the number of responses mentioning leadership or leadership roles in their answers to the question of expert characteristics, my assumption is that experts and successful veterans are typically looked up to and commonly placed in leadership roles in game development teams. In this category leadership is associated with people skills, communication, empathy and rapport. Positive uplifting disposition was a third clear theme in the spirit of the responses. For example, phrases like the following are typical of the responses in EA1: leading with positive attitude; nurturing, friendly; fantastic communicators that can mentor, teach, and present; boost the morale; give positive input; personableness.

The second subcategory Unpretentious Open Self-Awareness (used to support & motivate & grow) (EA2) carried the same spirit but contained references that were more focused on the expert's own pursuit of self-realization rather than in the effective management of relationships with others to achieve external goals. Besides the use of the terms Awareness and

Self-awareness, some of the concepts used in the responses included being open, growing and learning, humbleness, listening to and learning from everyone regardless of their hierarchical position, and being able to take direction and criticism. Employers, employees, and especially team members want to work with self-aware and other-aware people who desire the highest good of both the individuals and the team and genuinely like the team members. Self-awareness includes realistic objective relevant self-assessment of competencies divorced from personal judgments of superiority or inferiority. Confidence in this sense is a realistic assessment of probabilities regarding the accuracy of perspectives based on empirical experiential evidence, without the influence of perceived superiority or inferiority. Expressions of confidence that are perceived to be groundless or based on self-perceived superiority are more likely to be negatively judged as arrogant or cocky and become a negative characteristic.

The collaboration theme has been discussed previously under other contexts. It is a major theme in EA3 (Collaboration) as well, but there were no real new concepts brought up in the context of an expert characteristic. EA4 (Communication and Rapport [across disciplines and personalities]) however brings up a new concept related to a holistic perspective able to see the big picture across disciplines, divisions, jobs, and personalities and to bridge those gaps with insight and excellent communication skills. One of the most common issues illustrating the value of this characteristic has come up at every Game Developers Conference (GDC) I have attended for the last thirteen years, and came up once again at GDC 2011. That is the communication issue between artists and programmers. The problem has been described as arising from many different factors including a combination of completely different ways of thinking and seeing the world, different backgrounds and experiences, different languages, different interests, and different habits of mind and body. Some of the related communication concepts of expert

characteristics include rapport, being able to smooth things out, and the ability to communicate with unlike people, for example programmers being able to communicate and work with artists (and vice versa) and being able to communicate with all the disciplines on a team: art, code, design, sound, management, etc.

The holistic perspective has come up and been discussed a number of times in previous questions and it showed up here again (EB) as a major characteristic of experts and successful veterans. EB1 (Holistic Broad & Deep Foundation...) distinguishes experts' knowledge and perspective from their actual problem-solving and decision-making actions or behaviours in EB2 (Problem Solving & Decision Making).

Experts are distinguished by a perceived superior ability to analyze problems thoroughly, quickly, and accurately; to design or decide on effective actions; and to consistently/dependably deliver results. Their superior ability is based on their level of holistic breadth and depth of experiential knowledge and understanding (including observational experience) as evidenced by a valid track record of successful practice. The key theme of this category is not the holistic perspective itself but the need for and value of holistic perspectives in expert decisions and actions that are perceived as dependably effective. Perceived holism provides a level of confidence in those decisions and actions that is very valuable for teams who are submerged in complex and intense environments that are

kind of like a helicopter. A helicopter is built to kind of tear itself apart, all the parts want to move away from each other, it is kind of like that when you are developing a game, it feels like all the parts are wanting to move away from each other and you are doing everything you can to try to keep the helicopter flying and together. (Pierre, 10:00)

Production people want to focus on the vision, not on trying to figure out and fix very complex problems that are beyond their expertise and are sabotaging their efforts and productivity. Team morale can deteriorate quickly when there are no clear agreed upon

solutions, and experts are naturally looked to for direction according to their perceived levels and quality of relevant holistic perspective, that is to say the breadth and depth of their experience. The team's perception and resulting confidence is initially affected by the expert's confidence and ability to communicate (explain the plan and elicit confidence), but is eventually judged according to their results. Regarding team perception and leadership one interviewee had this to say:

another one [characteristic of expertise/leadership] is decision making without hesitating. We say that "perception is reality" and if the team perceives you are not making decisions, even if you are, then they become disgruntled ...communicate decisions constantly, let people see that we are moving forward.... Successful people get the respect of their team; they get their team behind them. I have a person who is extremely talented but can't get their team behind them, can't get them to see their vision and it causes huge problems and dissention. (Werner, 43:00)

Connections between expertise, leadership, awareness (see category EA), and holistic perspectives surfaced often. One interviewee's (Gandalf, 1:00) first identified expert characteristic was "leadership," which he described as someone who understands their discipline so well that they are not afraid to take charge and make decisions [confidence], and who is able to dissect and figure out a huge complicated problem quickly [heuristic processes based on holistic knowledge], communicate to the team how to fix it, and get the right people on the task and deliver on time [effectively manage people and relationships for effective productivity].

Some of the concepts that reflect the references in EB1 included a holistic cross domain view of the whole process and all the elements; a critical eye developed through lots of practice, trial and error and study; a deep understanding of their discipline; knowing what effort is required; knowing technical limitations in advance; and being clear about needs and wants, including a balance between personal life and work. EB2 references included quickly eliminating noise and getting right to root causes (speed was a distinguishing characteristic of

expertise); foreseeing problems and explaining to the team how to fix it; getting the right people on the right task and delivering on time; being unconsciously competent; applying ingenuity and innovation to the process (as distinguished from the product itself); and translating an artistic or design vision into deliverable tasks.

The three main characteristics in the category EC (Passion for Profession [that acts as fuel]) are passion, perseverance and growth. But as mentioned in the introduction to expert characteristics what is more important for understanding the perceptions reflected in this category is the relationship between these concepts. Passion is a characteristic that is perceived as an absolute necessity for acquiring expert or successful veteran status, but is not perceived as an independent attribute. Rather, passion is seen as a necessary foundation for other characteristics required for success. One way to capture the sense of the relationship is to say that passion fuels perseverance and the desire (or motivation) to pursue lifelong learning (growth). Persistent motivation, visionary longing, hope, and the giving up of oneself in service are traits that lead to the type of exceptionality that seems to be associated with successful expert status, and these arise out of passion and the pursuit of passion.

In EC1 (Committed Perseverance [in the pursuit of excellence]) expert characteristics include passion that remains the focus and goal for dedication and perseverance, doing it because they love it, passion that goes beyond the call of duty, where work is their passion (work = passion = interest/hobby), and having a passion for the art and work rather than money or jobs. Because successful experts are passionately involved they are always looking for ways to improve, to learn and stay up to date (in all related fields, for example in trends regarding types of games, technology, and consumers' wants), and they are adaptable to and embrace constant

change as a desirable aspect of continuous improvement in the pursuit of excellence as it relates to their passion goals (EC2 Lifelong learning & Adapting to Change).

The Professional Demeanour category (ED) also has integrated themes and the sense of higher-level consciousness, though less so and with fewer multiple integrated themes. The focus on an expert characteristic of professionalism (as is reflected in its description in the introduction to expert characteristics) was on the value that expert ways of being and acting have for the team and company. The key characteristics are based on the added value experts bring to the team beyond just doing a job or turning in the expected work, and in contradistinction to people who use up team resources (such as time and effort) to keep them productive and not disruptive. The professional demeanour or ways of being and acting that achieve this are (ED1) effective work behaviours arising out of aligned values and ethics, as opposed to those who are only following external rules. Words and concepts used in this subcategory include a strong work ethic, pulling their weight, dependable, organized, attention to detail and rigour, lots of documentation pre-production and planning, maintain enthusiasm and optimism (do not succumb to complacency and systemic cynicism).

ED2 had more crossovers with other expert characteristic categories, particularly with the concept of being looked to for leadership in high-pressure situations. Experts and successful veterans are esteemed as having seen and done it all and survived many battles, leaving them with the knowledge, internalized perspectives, and confident self-control to remain calm and collected under pressure, make decisions, and take actions that have a high probability of effectiveness for themselves and the team (because it is based on a holistic perspective gained from experience and a collaborative care that includes the interests of the team). Words and concepts used in subcategory ED2 included the ability to detach and not let themselves get

frustrated or overwhelmed but instead stay focused, calm, and assured even under high pressure, take charge, not being afraid to make decisions, and having a laid-back assured confidence in their opinions (within their area of expertise that is so familiar as to be second nature to them => unconscious competence).

The confidence identified as differentiating successful veterans and experts is a confidence arising out of years of experimentation within their own experience. Of course the perception of the team that a person is confident is based on judgments of cues within a soup of perceptual triggers, including the expert's demeanour and the knowledge people have about the person's past experience and accomplishments. In the game industry it is prestigious to have completed a number of shipped games, and that prestige rises with the number of successful or well-known games shipped, for instance AAA (big budget) titles in general or a specific game that team members respect. Of course such credentials do not guarantee the person will possess confidence or that the confidence others have in that person is justified. As well, it was pointed out by some interviewees that some exceptional veterans don't get recognized in appropriate measure to their expertise and contribution because they don't present the characteristics and behaviours that trigger the perception of confidence, for example they are so shy they fly under everyone's radar. On the other hand, some people over-present the characteristics of confidence relative to the team's perceptions of their level of competence and experience and cross the socially perceived line between confidence and cockiness. This can easily lead to dysfunction. A metaperspective on this situation would be valuable for novices as the issue of overconfidence surfaced as a common novice negative characteristic.

The third subcategory of Professional Demeanour is Self-Managed and Self-Directed (ED3). This way of being and acting has already been discussed under other questions. I will

only reiterate here that the expert characteristic is differentiated by level of self-awareness, holistic perspective and knowledge, and disciplined mastery, which typically come only from years of practice. Some of the concepts and words used in the references include: taking responsibility and accountability, owns it, runs with it, has a discipline of mind, sets goals and follows through, and meets or exceeds deadlines with no micromanaging needed.

Positive characteristics extrapolated from negative characteristics. Table 29 shows the negative characteristics categories next to positive characteristics derived from considering what the inverse behaviours or characteristics would be for each negative characteristic category. The most difficult category was Defensive, partly because what is perceived as defensive behaviour can have many sources that multiply the potential inverse behaviours across categories. Interviewee terms for the opposite of defensiveness included “don’t take it personal,” “be thick skinned,” “let it roll off your back (like water off a duck’s back),” “don’t get emotional,” “don’t freak out,” “take direction,” etc. There was also an ideal that the novice should be mature and aware enough to not take it personally and not be hurt or offended, not get ego invested in their work, and interpret feedback and criticism as helpful and valuable input for moving them forward in their passion goals and pursuit of excellence. I tried to sum all this up by expressing the positive characteristic as Sincerely Receptive to Direction, Opposing Positions, and Criticism. The positive inverses of negative characteristics were then compared with the Ideal Characteristics and Expert Characteristics (previously discussed) and those mappings are shown in **Error! Reference source not found.**

There were clear parallels between all of the inverse negative categories and the Ideal Characteristics and Expert Characteristics, with the exception of ED2 in the expertise category and H and I in the Ideal category. The H and I discrepancy was expected as per the reasoning

discussed in the ideal category section (filtered out by design). ED2 is the subcategory Calm and Confident in Stressful Situations. It was tentatively bracketed with the holistic categories because the context of the expert characteristic is a calm confidence born of experience that gives experts a higher-level perspective to assess their situation with experientially validated solutions and a good probability of transferable effectiveness. Novices were described by one interviewee as “freaking out,” (Laura, 37:00) the opposite of calm and confident in a stressful situation, but there were not enough references to that type of behaviour to justify a category.

Table 29: Positive Characteristics Extrapolated from Negative Characteristics	
Negative Characteristics:	Positive Inverse of the Negative Characteristics Categories
Poor Communication [cp]	Good Communicator: openly shares good and bad news
misFit (Fit = Productive Rapport, befriend, clear productive friendly conversation, not too shy or too arrogant) [cf]	Fits in with team, creates rapport with interests & values & style, is liked, uses appropriate etiquette
Defensive [cd]	Sincerely Receptive to Direction, Opposing Positions, and Criticism
Superiority Entitlement Ego Myopic [ce]	Appropriate social interactions and reasonable expectations
Antisocial [ca]	social: pleasant, respectful, acts with expected etiquette
Non-Collaborative [cc]	Collaborative, interpersonally effective team player, willing to go beyond comfort zone to do what is needed
Non-Accountable [cn]	Accountable: does what it takes to get the job done, tells the truth about problems, resolves issues
Poor work habits [wp]	
Lax Work Ethic, <100% Work Effort [we]	100% committed work ethic: reliable, thorough, timely, gets job done whatever it takes.
Non-Initiating [wi]	Self-Initiating: looks for how to improve self and work, researches, looks ahead
Unorganized [wo]	Organized: uses tools to improve effectiveness
Holistic MetaPerspective Gaps (a lack of awareness and perspective) [h]	Pursues Holistic perspectives, pushes boundaries of awareness and knowledge and assumptions: gains knowledge of Industry, job, pipeline, society, and self, and uses that knowledge in decisions

Table 30: Negative Inverse, Ideal, and Expert Characteristics Mapped		
Positive inverse of Negative Characteristics	Ideal Characteristics & Behaviours	Expertise (direct question responses)
Poor Communication [cp] Good Communicator:	A - Social and Collaborative Effectiveness	EA - Awareness of Self & Others (applied to interpersonal & team communication & relations)
Fits In With Team, Creates Rapport		EA1 - Build Nurture and Manage Relationships
Sincerely Receptive To Direction, Opposing Positions, and Criticism	E - Self-Aware Openness	EA2 - Unpretentious Open Self-Awareness (used to support, motivate & grow) EC2 - Lifelong learning & Adapting to Change
Appropriate Social Interactions and Reasonable Expectations	D - Personableness E - Self-Aware Openness	EA2 - Unpretentious Open Self-Awareness (used to support, motivate & grow)
Social: Pleasant, Respectful, Acts With Expected Etiquette	A - Social & Collaborative Effectiveness	EA4 - Communication and Rapport (across disciplines and personalities)
Collaborative, Interpersonally Effective Team Player	A - Social and Collaborative Effectiveness	EA3 - Collaboration
Accountable: Gets Job Done, Tells The Truth, Resolves Issues	G - Delivers Results: Reliable Accountable Productivity	ED3 – Self-managed and Self-Directed.
Poor Work Habits [Wp]		
100% Committed Work Ethic: Reliable, Thorough, Timely, Gets Job Done Whatever It Takes.	C - Enthusiastic 100% Participator (Passionate commitment)	ED1 - Appropriate Professional Work Ethic & Values. EC1 - Committed Perseverance (in the pursuit of excellence)
Self-Initiating: Looks For How to Improve Self and Work, Researches, Looks Ahead	B - Self-Motivated Self-Management	EB2 - Problem Solving & Decision Making
Organized: Uses Tools to Improve Effectiveness		ED3 - Organized, Thorough, Rigorous
Pursues Holistic Perspectives, Pushes Boundaries of Awareness and Knowledge and Assumptions	F - Holistic Perspective (including industry, company, team, technology & process, and self)	EB - Holistic [possibly ED2 - Calm and Confident in Stressful Situations]
		ED2 - Calm and Confident in Stressful Situations
	H - Talent & Creativity I - Technical Competence	

The lack of specific direct references to Calm and Confident characteristics may reflect a lower importance for novices and employees than other characteristics, or it may be that those characteristics were captured in other categories. Perhaps the inverse of Calm and Confident was associated with emotional control and communications and therefore was captured in the poor communication category (that included interpersonal/social/collaborative characteristics). Another possibility is that the lack of references may reflect a general social and industry assumption that novices are not responsible, accountable, or expected to deal with major issues, whereas experts are specifically looked to in those situations and so calm confident would be a hierarchically high characteristic for experts. Whether ED2 fits with the holistic category was not considered significant and no further analysis was done.

Successful games-industry veteran expert described. The responses from questions 1, 3, and 4 provided three perspectives from which to view successful characteristics and behaviours. These perspectives were used to create a description of an expert or successful veteran that reflected the perceptions of the interviewees. Interviewees were asked for their perception of the top five most important characteristics of successful industry veteran experts without being provided a definition of the terms. Clarification was provided to the level the interviewee sought it. The most common request from interviewees was for confirmation that the technical skills related to the expertise subject matter were assumed and didn't need to be mentioned, for example an expert programmer is assumed to have a high level of programming skills. From the categorized and summarized references came the following description: *a Successful Games-Industry Veteran Expert is perceived as possessing an informed meta-aware perspective that acts as a foundation for recognizing and reconciling participation in personal and external goals, analysis and decision-making, managing interpersonal relationships, and*

managing stressful situations with calm confidence. Managing interpersonal relationships includes consistent personable and respectful communication and collaborative and professional behaviours. Successful professional behaviours are motivated by their alignment with personal goals based on a high-level passion that fuels Committed Perseverance (in the pursuit of excellence), lifelong learning and adaption to change, work ethic and values appropriate for the context, and self-management.

Since the references are specific to the games industry, I considered distinctions between what might be regarded as industry expertise from other areas of expertise such as those related to the list below. Types of expertise were considered in relation to the types of skills or skill areas that game developers are perceived to require and those that schools teach. Areas of expertise that were considered include:

- Knowledge domain, discipline, or profession or craft—knowledge and task based *subject-matter expert* (SME).
- Physical performance skills (such as a dancer, musician, or boxer)—usually perceived as also requiring an exceptional level of aesthetic sensibility or metaperspective to achieve the excellence that is perceived necessary to be considered an expert.
- Aesthetic or design or organizational sensibility such as required by a designer or artist or director—perceptual and articulatory performance skills.
- Artistic ability (talent) such as musicality or visualization—perceptual and articulatory performance skills.
- Technical ability such as required for a technical director or recording engineer—usually perceived as also requiring an exceptional level of knowledge, skills and sometimes aesthetic

sensibilities (a few interviewees used the term “technical skills” this way and one used “technologist” [Pierre, 52:00]).

- Task focused operational skills, for example as required to operate software and hardware.
- Management, for example organization, strategy, planning, and execution.
- Leadership.

Radical Entertainment published a news release in early 2000 regarding their collaborative efforts with UBC (http://www.radical.ca/press_release.cfm?ID=43060544) to prepare for a labour crisis of top *technical* and *artistic talent* in the gaming industry. Technical and Artistic categories reflect a common-sense logic for the technical arts that was evident in interviewee responses. When asked what characterizes a successful veteran/expert some interviewees started immediately with personal characteristics, but otherwise the most common response or question centred either on technical skills or artistic skills. Interviewee responses generally perceived expertise within three broad categories: 1) technical, 2) artistic, and 3) personal characteristics. The perception of expert characteristics is a main focus of this research but it is useful also to discuss perceptions of the Technical and Artistic and Talent categories.

Two interviewees used the term *technical* to refer to the production pipeline and process, and the specific production tools used in the game industry, as distinct from say the film production process. In this sense a lack of technical knowledge and skills was identified as a gap in novice game developers regardless of the level of experience or expertise they had acquired previously in other fields. Another interviewee distinguished technical skills from design and communication skills. *Technical* was also used interchangeably with *technology* and *technologist*, for example in the context of a *Technical Director* who is an expert relating to the creation, maintenance and problem solving of large-scale technology infrastructures needed to

support an efficient game production pipeline and collaborative process. But generally people used the word *technical* to refer to skills and abilities (including knowledge) needed to complete operational tasks using technology. So, a better and more encompassing word for a category might be *operational* because it covers a broader range of interviewee references including skills, technical skills, and more specific references such as mocap (motion capture) or software.

The term *artistic* was also used in a few different ways including the ability to draw and having an artistic sensibility, while *talent* was used to refer to a combination of ability and sensibility for exceptional outcomes. *Talent* was also used in reference to non-art related areas, for instance a talented coder or manager. In North America *talent* is commonly associated with an entity trait, that is, an inborn trait that people either have or don't have, especially as it is related to intelligence, creativity, innovativeness, or artistic expression, and that therefore can't be significantly altered, taught, or developed. An *entity theory* (also called a *fixed trait theory*) perspective was expressed in some responses, for example,

have you seen Ratatouille? ... anyone can cook, but I think it takes a certain personality to really ... cook exceptionally, to be a master chef. Same thing ... when it comes to like hiring ... it's black or white, got it or doesn't got it. (Laura, 1:02)

Although a person's level of talent falls along a continuum, when used to describe expert characteristics the term was restricted to people who possess a level of talent that distinguishes them or their work as exceptional. For example, another interviewee said

if we find someone who's just talented ... we would rather try and find a way to incorporate them and for us to accommodate their needs for personal growth than trying to force them into a role that we've predefined ... because talent is talent. It's just really hard to find. [Talent is hard to find?] Yes. [Do you mean exceptional talent?] Yes. (Kristina, 46:00)

In North America common usage of the word *talent* can include many ideas such as intelligence, artistic ability and sensibilities, leadership, and entrepreneurship. Ideologies

concerning *talent* include *auteurship*, which often includes ideas of a natural ability to see the world differently, below the surface, broader or closer to reality or important and challenging, than the masses. The perception of the word *artistic* as embodying creative, innovative, aesthetic, and design sensibilities, along with the ability to recognize exceptional art and/or talent, might be captured within the concept of a professional level of *connoisseurship* that results in performance or product perceived as exceptional in distinction to the merely good (for example, exceptional art or animation or code). Dewey (1991) suggests that “possession of this ability to seize what is evidential or significant and to let the rest go is the mark of the expert, the connoisseur, the *judge*, in any matter” [emphasis in original] (p. 108). This use of connoisseurship is also discussed in the context of education by Eisner (1991) and by Collins and Evans (2007) as a type of expertise.

Depending on how expertise is contextualized, it can be argued that a person could be an expert in knowledge without any technical or artistic ability (Collins & Evans, 2007). As well, a person could have technical and artistic expertise, for example as an expert animator, pianist, or chess player, without possessing any other characteristics. An expert marksman has spent sufficient time in deliberate practiced shooting that they have mastered those sets of skills to a level that is recognized (by someone) as being in the class called expert. Likewise, an expert animator would have exceptional technical and artistic animation skills, and these skills have been fairly well researched, particularly the technical skills required for vocational animation training. But the focus of this research was consciously on characteristics of an industry expert with industry being defined broadly as a complex set of relationships between many entities with various agendas and intentions but with a common inter-relationship to specific products or outcomes (they don't have to be physical products but could be any output or outcomes

including proselytizing and creating wealth). A Veteran Games Industry Expert could have any number of specific personal areas of skills expertise, animation for instance, but the expression would carry a very different common understanding than would an expert animator in the games industry. To be an industry expert as I am proposing would require that core expertise characteristics had been developed that would be reasonably applicable to a large majority (perhaps 80% plus) of potential serious and complex situations that would commonly occur in the industry (with *industry* as understood by the relevant community using the term).

An important idea emerging from this research is that a purposeful efficient and effective transition from novice to veteran expert might be significantly improved and accelerated by curriculum that promotes a clearly articulated set of outcomes that are characteristic of successful veteran industry expertise. This curriculum should be founded on common characteristics of expertise for both novices and veterans, with the understanding that the developmental levels and/or expectation standards would be much higher and rigorous for the veteran-expert, but not of a different kind. A novice will understand that to be effective they must try to grasp the big picture and how they, and the effects of their actions, will fit in with the process, goals and outcomes of the community they are participating in. A veteran would be expected to have much more experience and knowledge for assessing situations, such that the probability of arriving at the best solution (called “what is doable well” by Laura [32:00]) is extremely high. The core approach from both would be the same, just from a perspective that is as holistic as possible relative to their level of development and experience. The novice would need an aware and realistic self-assessing holistic perspective while the veteran expert may be unconscious of their holistic perspective (Dreyfus & Dreyfus, 1986, 1999, 2004).

Based on the industry expertise core characteristics derived from interviewees, veterans would also be expected to be humble, to collaboratively contribute to the development of those with less expertise, and to model a humble novice-like approach to knowledge and learning (fallibility and reflective thinking or reflective practice). Perhaps Dreyfus and Dreyfus' notions of advanced beginner, competent, and proficient are useful for blurring boundaries between Novice and Expert dichotomies and contextualizing the type of characteristics being considered here. This fits with the pragmatic principles of focusing on outcomes achieved through a process of open, experimental, intelligent-action research that is shared with all the community and democratically judged according to agreed-upon outcome goals.

In the process of exploring expertise gaps in novices I was fortunate to receive a glowing in-depth report from one interviewee who provided an example of a novice with expert characteristics so strong that no one would have suspected she was a novice if they didn't actually know it was the case. I was also fortunate to be able to interview this person. Although the research design did not anticipate this topic, the analysis of the description resulted in what may be the most valuable, and certainly the most surprising result of the research, and I will return to that subject soon. .

Research Question: Do Production Team Perceptions Align With Employability Skills Research?

To answer the main research question, the categorized results of interviewees were first compared to categories from the *Conference Board of Canada Employability Skills 2000+* profile (Conference Board of Canada, 2000). The *Skills 2000+* profile came out of an ongoing longitudinal research project and was chosen because it is highly regarded, internationally recognized, and is generally representative of employability research internationally as well as in

Canada and the US. Comparisons were also made with the HRDC Essential Skills (Human Resources and Skills Development Canada, 2011) as representing a class of employability skills research that focuses on very basic competencies that include basic life skills. Because of this focus the HRDC skills do not fully align with other research and the results from this study and as such were considered potentially informative from a different perspective.

Appendix 4 presents the Employability Skills (ES) in their exact wording and categories with a Relevancy Weighting for each skill indicating how close it matched the results of the interview coding. Table 31 presents the average Relevancy Weighting for the three ES categories. Two of the three ES major categories average a very high Relevancy Weighting: 5 out of 6 for Personal Management and 5.9 out of 6 for Teamwork Skills. The other category, Fundamental Skills, was less well matched with an average of 3.9. One reason for the lower match is that the category and many of its subcategories parallel the lower level HRDC Essential Skills, for instance: write, speak, listen, read, use written materials (graphs and charts), use voice, email, and computer technology to communicate, and use mathematics. These fundamental skills might be considered more relevant if they were defined by complexity level. But the ES description does not define the complexity level and it is fairly safe to assume that the level is meant to be low or average for the North American population since the focus of the research is general entry-level job skills.

Table 31: Conference Board Employability Skills Profile 2000+ Weighted by Relevance to Research Categories	Relevancy Weighting
	Average 4.85
Fundamental Skills	(Average Weighting: 3.9)
Personal Management	(Average Weighting: 5)
Teamwork Skills	(Average Weighting: 5.9)

Table 32 gives the percentage of ES items that are related¹² to Game Developers (GD) expert characteristics along with the percentage of GD responses for each category. Each ES

Table 32: Conference Board Employability Skills 2000+ (ES) Coded to the Expert Characteristics	% GD Direct	ES %	Challenge- Ch (tot) %
Expert Characteristics			
EA Awareness of Self & Others (applied to interpersonal & team communication & relations)	34	(40)	20 (36)
EA1 Build Nurture and Manage Relationships	34	6	6
EA2 Unpretentious Open Self-Awareness (used to support & motivate & grow)	7	11	5
EA3 Collaboration	7	17	3
EA4 Communication and Rapport (across disciplines & personalities)	6	6	2
EB Holistic	25	(15)	1 (11)
EB1 Holistic Broad & Deep Foundation (for problem solving & decisions in complex situations)	14	11	4
EB2 Problem Solving & Decision Making	11	4	6
EC Passion for Profession (that acts as fuel)	20	(21)	8 (22)
EC1 Committed Perseverance (in the pursuit of excellence)	13	10	8
EC2 Lifelong Learning & Adapting to Change	7	11	6
ED Professional Demeanour	20	(22)	0 (14)
ED1 Appropriate Professional Work Ethic & Values	7	6	5
ED2 Calm and Confident in Stressful Situations	7	5	0
ED3 Self-Managed and Self-Directed	6	11	9
	Not matched	3	17

item was coded for matching relevance then the total weighted score was used as the relevance match. The Not Matched category had a 4% drop from 7% to 3% when weighted. That result is expected due to the lower Relevancy Weighting of the majority of items that didn't match, which is why they are in the Not Matched category in the first place. The Not Matched category had the greatest weighted difference and the other differences were not considered significant. Also included in this table are the percentage of matches for the Conference Board's research and

¹² All ES skills were mapped to each GD category and counted based on being a match or non-match. Additionally, each ES skill was rated for level of match. For comparison sake weighted and non-weighted percentages (out of the total matches for that category) were used.

report *Out of the Classroom, into the Workforce* (2003b), in the column labelled Challenge (Ch). This study focused on the perceptions of mainstream youth employment experts and agents regarding the challenges governments, parents, educators, industry, and students face in dealing with the increasing problem of skills gaps and the challenges facing novices entering the workforce.

The percentage of GD responses per category compare very well to the ES skills that matched the same category:

EA Awareness ...	GD 34%	ES 41%
EB Holistic ...	GD 25%	ES 14%
EC Passion for profession...	GD 20%	ES 21%
ED Professional Demeanour	GD 20%	ES 21%

The most surprising aspect of this comparison is not that there were differences but that there were so many matches between entry-level employability skills and perceived characteristics of experts. Matches between ES and Negative Characteristics would be less surprising but each Expert Characteristics category had a substantial number of matches with minimal non-matches.

Table 33 shows matches between the Conference Board Employability Skills (ES) and Game Developer interviewee (GD) perspectives of Negative Characteristics. These mappings and percentages are potential indicators only and are intended to help clarify thinking, analysis, and the presentation of material. They cannot be used to defend any statistical correlation, but they may be valuable for triggering questions and for overall comparisons and generic soft validation. Although there are clearly significant differences in what is being investigated, by whom, and for what, a key point is that there are clear parallels of all of the major categories and concept areas derived from interviewee responses. There are also clear parallels in the tone and

sense that front line workers, employers, and youth employment workers have regarding the complex and intricate web of issues this dissertation is attempting to define and display with simple charts and percentages. In addition, speculation using the mappings and percentages may lead to interesting and valuable insights suitable for further investigation.

The overall differences in category percentages may reflect a high level of congruity with the concepts but a difference in emphasis. Based on the coding results for the three groups, one indication is that employers (ES) place more emphasis on communication skills, the same amount of emphasis on work/professional skills, and less on holistic perspectives than game leaving the game developers in the middle between ES and Ch. developers (GD), with the opposite being the case for the youth employment experts (Ch),

Table 33: ES and Challenges to Youth Coded to Negative Characteristics	GD		ES		CHALLENGES to Youth Ch	
Poor Communication (cp)	9%	42%	6%	56%	2%	25%
misFit (interpersonal/social behaviours) (cf)	8%		17%		9%	
Superiority, Entitlement, Ego Myopic (ce)	8%		9%		5%	
Non-Collaborative (cc)	8%		10%		2%	
Defensive (cd)	6%		8%		2%	
Antisocial (ca)	3%		4%		4%	
Non-Accountable (cn)	2%		2%		0%	
Poor Work Habits (wp)		22%	1%	22%	6%	24%
Lax Work Ethic, <100% Work Effort (we)	10%		4%		13%	
Non-Initiating (wi)	7%		13%		3%	
Unorganized (wo)	4%		3%		2%	
Holistic gap (h)		36%	8%	20%	16%	43%
Industry (hi)	14%		0%		15%	
Pipeline (process, systems, tech) (hp)	10%		1%		0%	
Self (hs)	6%		7%		11%	
Company (hc)	4%		1%		0%	
Social Expectations (@ work) (he)	3%		3%		0%	
Not matched			2%	2%	8%	8%

The results for the holistic category overall may indicate that the youth transition experts (per my Ch coding) perceive a holistic gap as a pronounced challenge, with 43% of the items reflecting some aspect or level of that concept, and therefore the results provide confirmation that some concepts in the holistic category are not only valid but are perceived by youth transition experts as very important in relation to youth entering the work world. Perhaps the youth employment experts experience what they perceive to be a lack of perspective and awareness in youth (including external knowledge and self-knowledge), which is a much greater challenge than communication skills (which were rated much lower than holistic perspective but just slightly higher than work behaviours). Alternatively, the perception may not be of a greater challenge, but rather of a prerequisite challenge that must be overcome before trying to tackle communication and work behaviours. If a person hasn't found a passion and committed to a mission and vision, then setting goals and being self-motivated to improve communications or work behaviours or to learn skills can lack relevance and will almost certainly have to be externally driven. Even a person who has committed to a passion goal may not be motivated to work on other skills unless they can see how it fits into their big picture, so again the holistic big picture perspective may be a prerequisite as well as having foundational importance.

In reflecting on potential perceptual differences between game developers, employers, and youth employment experts, it is reasonable to assume that youth employment experts' perspectives would be based on experience with pre-novices in addition to feedback from various specific industry partners and generic research. Employers' perspectives would be based on their own company HR issues and needs and, if they are executives, from feedback they receive from internal reports and perhaps also from some amount of general external research. The Game Developers' perspectives came from their direct experience with their team members,

who included all levels and types of members from novices to veterans to experts. Even if we assumed that the percentages had some correlation to an external reality, there is no way to say whether one perspective is more accurate than another. But using the middle ground GD perspective as the base, and the above assumptions, a reasonable interpretation is that the employers have a higher value for the characteristics in these categories because they have to turn away or fire employees who lack these characteristics, and that is costly for them. This possibility would be supported by interviewee responses, as previously pointed out, which identified management's tendency to view the production more in terms of fitting parts into the machine, rather than the social/interpersonal fit the team is concerned with, as well as the cost of constant retraining.

In mechanistic terms, management needs parts that work (are productive), and which don't break the machine and don't have to be replaced often. But related to machines breaking, interpersonal problems and conflicts were identified by one manager as their number one problem, in other words, the number one cause of the machine breaking down. Other literature previously referenced (Beach, 1982) states that the most common reason people are fired or denied promotions (87%) is non-technical (non-job competence) issues such as interpersonal and various behavioural problems. This perspective was affirmed by some interviewees, and there were no disconfirmations. But there seems to be a large disconnect from this employer perspective and the practice of describing jobs (job descriptions) for hiring and for curriculum development. Job descriptions tend to focus on the technical skills. It is no wonder then that youth employment experts and employers tend to ascribe a lesser value/need to non-technical skills. As previously discussed, this technical skills bias is exacerbated by a general corresponding cultural perspective in which education consumer-clients (previously called

parents and students) demand products that meet their perceived wants, and entry-level skills tend to be what they perceive they want, need, and are buying. Game developers as practitioners fall in the middle because their frame of reference is based more on the actual demands of getting their job done without burning themselves out and so is perhaps a more balanced view of the needs. These factors could explain some of the differences in the percentages.

If the items within a defined application focus, for example Novice Negative Characteristics, actually are valid, that is to say they actually are common negative characteristics that must be improved for success, then if the characteristics that employers have identified as what they are wanting/needing in novices matches the categories/content in a relevant way, those characteristics can be said to be important from two relevant perspectives: production team co-workers and employers. If no matches are made then either the categories aren't relevant or valid from one perspective (the employers' perspective, given the assumption here) or the employer perspective is not relevant or valid to the reality being examined.

In answer to the research question of whether the GDs' perceptions align with other literature and research into employability skills, the evidence as presented in this chapter points to a very close alignment. Very strong parallels also emerged from this research regarding the characteristics of exceptional novices with research on expert learner characteristics. But interviewee responses have illuminated some potentially major gaps in the expert learner models that may improve effectiveness and value.

Although the similarities are strong, the differences and nuances could have dramatic importance to the relevance of applying the employability skills research to the game industry. This is especially the case and more critical for game industry curriculum than would be the case for the development of curriculum in more traditional and stable industries. The game

development environment is a complex environment. Overall, the employability skills may be too generic and low level for game developers. As per the HRDC process, each skill could be researched and profiled for jobs specific to the game industry, but even then it can't cover every company and every situation and every individual. The HRDC process is necessary with respect to defining vocational technical skill sets, and when considered this way it would not be surprising if institutions never get any farther than this, and may have a very tough time just trying to keep up with the process. Is there a better alternative for the employability skills?

Chapter 5 – Unexpected Results

When interviewees were asked to identify expert characteristics they often would look puzzled and ask what specific job or field I was asking about, and when I said I was interested in any or all fields, some could not initially do it and so started with specific positions or fields such as engineers, artists, and managers. Then, as they talked through the characteristics, it occurred to them that the characteristics were not specific to a discipline or job as were the technical or artistic skills, as they initially assumed, but were generic for all areas. One executive stated that there were no significant generic characteristics and so began describing expert characteristics for each specific job, but much further on in the conversation he interrupted me to say emphatically:

but you know what, ...the truly exceptional people [the type of successful veteran/expert ideal that this research is interested in exploring] have all of these characteristics ... great at what they did and ... great people as well ... [they were] accountable, self driven, good at what [they did] ... [in] areas where [t]he[y] can improve on ... [they are the] first one to admit it and the first one to charge in there and work on those things.... Constantly learning, on both a professional and a personal level ... self awareness. (Totec, 45:00)

He also applied the same concept to students in speaking about the qualities of what makes someone exceptional: “it’s not the school it’s the person” (Totec, 18:00). The best students have the passion and discipline and successful behaviours, for example the accountability characteristic of experts and exceptional veterans. Another interviewee alluded to something similar regarding exceptional students as self-initiating and self-managed but just needing some direction and guidance.

The students that were exceptional I never felt like I taught them as much as challenge them and gave them a playground to actually do anything and everything they wanted to do. Some were great but had quirky problems that will hinder their success. So educationally you have to challenge them in every area that you want them to be good at. (Pierre, 45:00)

It started to appear that students can possess expert characteristics as evidenced by the fact that some do. But are these characteristics learned or perhaps based on personality?

The interviewee Sophia suggested that the industry as a whole would be in general agreement with the importance of the expert characteristics of confidence, self-direction, compatibility, and social skills and went further to say that

schools generally can't really teach you ... well they could, but ... those things aren't taught. It was kind of obvious [in school] who was helpful with people, and social, and obvious who the people are that had a hard work ethic, and I think in school people realize who's gonna be successful already at that point and I think generally they're correct, they have an intuitive sense of who is gonna be in demand, who is gonna get the first job, I don't think there are misconceptions there. (Sophia, 47:55)

After describing a number of expert characteristics I asked Janice if some of the characteristics could describe a novice as well. Her answer was quick and confident. "Yes, [the same characteristics would describe] those who have the potential to become a seasoned veteran. *The only difference is their actual capabilities* [emphasis added] ...that change." (Janice, 35:37). I asked what capabilities she was referring to and she said that she was referring not to technical skills like software but, in animation for instance, a good eye and the ability to self-diagnose their work. Similarly, Laura stated that

a novice can have the exact same skill set [as an expert], they just don't have the experience yet, that's all. That's a good place to start ... those characteristics ... as a novice [emphasis added], will just only channel you to do your best. (Laura, 31:00)

Laura identified experience as the key differentiator between novices who have expert characteristics and the actual experts. Yet, as Dreyfus and Dreyfus (1986, 1999, 2004) and Lave and Wenger (1991) caution, it is not a direct line or leap from novice to expert.

“...not a typical novice”: Description of an Exceptional Novice

Table 34 summarizes and categorizes descriptions given of Laura by her previous superior Gandalf. The content is derived from internal references initially and then compared with other categorization results from previous questions (as per the methodology used throughout this research). The summary has seven categories: Self-Managed, Aware, Open, Personable & Social, Holistic Learner, Consistent Dependable Results, and Mentally Aware & Prepared for Realities. I have numbered the categories 1-7 and the subcategory descriptors alphanumerically. The table also maps expert categories to Laura’s description. The blue bold text indicates areas of differences discussed in the text.

This exploration was prompted by the extraordinary description of Laura as a novice with characteristics that span a spectrum through advanced beginner, competent, proficient, and expert. The parallels and differences between the description of Laura’s characteristics and behaviours and the description of characteristics from this study were considered in order to shed light on how it was that a novice could be so highly perceived. Regarding category one, the relationship between passion and other expert characteristics (such as passion that fuels or motivates self-management) came up many times in interview responses, and not only applied to experts as previously discussed, but also to novices and students. One interviewee says that he looks for passion as an indicator that new hires will be able to do new learning and have what will be required to get them through tough times and challenges (Qualopec, 55:00). Janice and Laura stated that successful veterans’ work is likely also their passion and hobby and therefore what they enjoy doing outside of work. When a person’s passion and hobby is also their work then work can be their choice of leisure activity as well, and this is often considered an ideal job. From a personal experiential perspective (as opposed to a systemic or critical theory perspective)

Table 34: Exceptional “not a typical” Novice Mapped to Expert Characteristics		
	Exceptional Novice Characteristics	Expert Category
1	Self-Managed	D3 Self-Managed and Self-Directed
1a	- Self-initiating ownership	
1b	- Committed Perseverance to self-defined success goals fuelled by passion (self-actualization need level goals)	C - Passion for Profession (that acts as fuel), C1 Committed Perseverance (in the pursuit of excellence)
2	Aware	A - Awareness of Self & Others (applied to interpersonal & team communication & relations)
2a	- aware	
2b	- realistic assessment of self and work	
2c	- Realistic assessment of lack of experience and need to learn and grow	
3	Open	
3a	- humble (e.g., perceived her own awareness level and performance were not up to par)	A2 Unpretentious Open Self-Awareness (used to support & motivate & grow)
3b	- Open and transparent. Admits needs and asks for help in the active pursuit of growth and goals (takes confidence and drive)	
3c	- Participates fully in (gives 100% to) whatever tasks she is given	A3 Collaboration
4	Personable & Social	A4 Communication and Rapport (across disciplines and personalities)
4a	- Personable	
4v	- Interpersonal and social competence. No hang-ups as evidenced by no inappropriate behaviours that triggered interpersonal or social conflicts	A3 Collaboration
4c	- Welcomes and acts on feedback, input, direction, criticism (based on awareness of herself in the big picture and what she wants, i.e., her own definition of success)	A1 Build Nurture and Manage Relationships
5	Holistic Learner	C2 Lifelong learning & Adapting to Change
5a	- Practices Reflective Thinking	
5b	- Holistic problem solving	B2 Problem solving & decision-making
5c	- Ability to Learn (fast with retention)	
5d	- Ability to learn by observation	
5e	- Observes holistically, sees the system	B1 Holistic Broad & Deep Foundation (for problem solving & decisions in complex situations)
5f	- Improves the process (adds value)	
6	Consistent Dependable Results	D - Professional Demeanour
6a	- Consistent perseverance and dependability	D1 Appropriate Professional Work Ethic & Values
6b	- consistently delivered quality results	

(Table 34 continued)		
	Exceptional Novice Characteristics	Expert Category
6c	- paid dues and earned respect (through consistent results)	B - Holistic
6d	- Trooper	D2 Calm and Confident in Stressful Situations
7	Mentally Aware & Prepared for Realities	A2 Unpretentious Open Self-Awareness (used to support & motivate & grow)
7a	- Mentally prepared for the harsh realities of the industry	B - Holistic
7b	- non-Attachment – letting go of ego attachments (beliefs, behaviours, identities, habits, possessions, relationships, etc.) that sabotage achievement of self-defined success (a success goal could be thought of as mission, vision, values, passion, goals, bliss, etc.)	
7c	- non-Resistance – pursuit and active acceptance of situational reality (the way things are) in order to deal effectively with the situation for achieving self-defined success	
7d	- non-Judgment – letting go of judgments about reality (the way things are) and the need to be right about them in order to deal effectively with the situation for achieving self-defined success	

this can turn situations like overtime into an added benefit rather than a sacrifice of personal time, because not only are they paid to do what they love in their job, they also get paid even more to engage in their preferred leisure activities as well. But crunch-time is usually a severe test of stamina for even the most passionate developers. Cynicism (about the system) was pointed out as a key negative characteristic of veterans who don't navigate industry problems such as crunch-time well, and this was the context of another interviewee's reference to successful industry experts requiring something that enables them to get past the difficult and frustrating aspects of their work and not become jaded.

The parallels between most of the expert characteristics and the description of Laura are fairly obvious, but there are some interesting and important distinctions. In the first category Laura says that passion “reinvigorates you to learn more, and to see more, and try new things” and to persevere, “but a veteran can really focus in on one area and be passionate about that” whereas novice passion is often “all over the place” (22:30). She further distinguished a common

difference in the underlying source of passion between novices and experts by saying that the type of passion that contributes to successful expertise is a passion for the art and/or discipline (which is then focused on a relevant goal, for instance a specialization) characterized by self-motivation, perseverance, and enthusiasm for continuous learning, improvement and achievement of excellence. On the other hand, novice passion is often based, or focused, on needs or desires like money and jobs.

I would expand on these ideas by differentiating the passion for the art and craft as being based on creative and expressive needs, or in Maslow's words the need for *self-actualization*, verses work behaviours being fuelled or driven by what Maslow would label as lower level external needs such as security, reproduction, and protection of ego attachments (Maslow, 1987). An awareness of deeper self-actualization needs, understood in relationship to passion as the energy and motivation to pursue those needs, as well as passion being stimulated and reenergized from activities that meet those needs, reflects the type of passion Laura refers to.

The passion described above requires a focus or object of attention. Analogous to energy in its other various forms, the passion-energy must be focused or funnelled into the service of effective actions to get work done effectively. Experts are seen to have achieved a level of integrated holistic perspective, knowledge, self-awareness, and other attributes such as discipline and the management of self-sabotaging and successful behaviours, which empower them to channel passion into activities that support success. Novices generally lack both the individual subject-matter depth and the integrated holism to achieve the same level of effect. They also typically lack a personal definition of success sufficient to define goals for focused action, or measures of what constitutes successful results. This could partially explain why many students, even ones with clear passion, did not appear to interviewees to be motivated and self-managed in

their educational endeavours and career paths. They were seen to require external prodding and explanations that teachers, managers and colleagues perceive as unnecessary based on the expectation that any student in a program such as game development should possess a clear passion-focused career goal. Laura and other interviewees spoke of how passion could actually be detrimental to success of the individual and team if it was unfocused, uniformed, or misguided; resulting in passionately fueled dysfunctional actions and behaviours. As well, the more operationally specific a passion is defined, for instance as a specific job, rather than deeper needs with passion informed goals, the more inflexible the pursuit of passion is and the more susceptible it is to failure.

From an educational point of view, the first two years of liberal arts degree programs are seen by some to be a time for young students to explore and find a life or career focus along with defining for themselves other fundamental values, goals, and priorities. But in a short vocational program for a passion industry there is no time for this. To maximize the potential for success students need to be explicitly informed of the expectation and need for passion, and for the development of a perspective and discipline that effectively focuses, directs, and manages that passion. Some applicants and industry hopefuls may need to see the realities of what they are getting into in order to make an informed decision about proceeding in the vocational program or in the pursuit of industry work. They will be competing with many very passionate, clear, talented, committed, and driven people for jobs and success and recognition. If money is the primary motivation or goal, or if the career decision is being made on the basis that the job is fun and easy, then there are some serious misperceptions and educators have an obligation to ensure an adequately informed choice. As well, educators are obliged to consider the effects on other students, instructors, and the institution of the extra learning resources that are required to prod

and push students forward who lack passion for a passion industry. One interviewee emphasized the importance of peer effects by stating that unofficial social attitudes, behaviours, work quality, work ethics and the like are set by peers and become standards (and the corresponding height of the bar). These standards can have a dramatic effect on the motivation and performance of other students, whether positively by inspiring or driving a pursuit of excellence, or negatively by socially privileging unsuccessful behaviours or creating a discouraging atmosphere. I recommend Rebekah Nathan's book *My Freshman Year: What a Professor Learned by Becoming a Student* (Nathan, 2005) to educators as an insight to what it is like to be a student in today's educational system. It may facilitate some level of empathy and provide data improving the effectiveness of curriculum development and delivery methodology.

Even if passion exists, a lack of focus and clear career goals were characterized as sitting on the fence by one interviewee (Jerome), and he and other interviewees emphasized the importance of getting off the fence quickly in order to have a chance at success in competitive passion industries like games. An argument could certainly be made from the forgoing that passion and clarity should be program prerequisites if not also curriculum prerequisites for game development programs and courses. If so, educators would have a duty to screen for passion and clarity, or to provide for remediation prior to or within the program. Anecdotally, I have seen essays, references, and CVs used in the admission process to supposedly filter based on concepts such as passion, but I have never seen an explicit curriculum prerequisite for passion and goal clarity, nor objective validated measurement tools. From what I have seen, the process and the admission system it arises out of is also often inadequate.

The difference in category one between the passion of Exceptional Novice Characteristics and the corresponding (mapped) expert category is not a difference of kind but of

focus (goals) and level (breadth and depth of relevant experiences), and therefore of effectiveness for production team goals (Dreyfus & Dreyfus, 1986, 1999, 2004). Effectiveness as a conscious practice would require a sufficient level of awareness and knowledge of self and of the situation in order to make accurate assessments of the situational realities. For a novice, situational assessments will inform decisions on what learning, development, skills, and actions will be most effective for achieving goals that are aligned with the person's definition of success. The more depth and breadth of context knowledge and awareness there is (personal and interpersonal/social) the higher the probability that assessments and decisions will be effective. But by definition novices lack the quantity, quality, breadth, and depth of experiences and practice that experts possess. Therefore, in preparing a foundation for the acquisition of expertise, an adequate education would facilitate exposure to a breadth and depth of relevant experiences with explicit standards of holistic perspectives that include self, society, and interpersonal relationship, as well as the development and clarification of values, priorities, a personal definition of success, and goals that align with these.

If student values and goals don't align with the industry then that conflict needs to be made explicit if students are to make informed decisions about their career choices. A large part of Laura's success was the alignment of her deep passion and clear goals with her teammates who shared a common mission and vision. It was her focused drive in the pursuit of excellence in a shared ideal, encompassed by a holistic awareness, that were her successful attributes, not her actual ability level as a novice, which was not yet up to par. Experts were characterized as having figured out their priorities, values and ways of dealing with work life balance, and though novices may arrive without having it all figured out, they could at least arrive with awareness of their perspectives and perhaps of their gaps in such matters.

Many of the characteristics that I have separated into categories based on distinctions made by interviewees are nevertheless so integrated in complex relationships that it becomes difficult to speak of them separately. Awareness was discussed in the previous paragraph in relation to committed perseverance and self-management, but in the Aware category it is referenced to interpersonal applications and mapped to the same expertise category. A novice's level of self-awareness would reasonably be expected to be lower than an expert's and more focused on learning and growth. Because of that, the content of awareness and its application would tend to be more focused on self and gaps, whereas an expert's awareness would tend to be more focused on the situations and others and how to be effective. What is the same for both the novice and the expert, and far more important, is the accuracy of the self-honesty, openness, and self-assessment of external perceptions and situational effects. Laura's assessment of herself and her work was accurate to the team's assessment of her, and her decisions and actions were perceived as congruent and as appropriate to the social norms for the situation. She looked at situations as holistically as she was able, which included social perceptions. In so doing she recognized gaps in her outcomes, perspective, knowledge, or skill, and thus was able to identify where she needed to focus her energy and attention for maximizing effectiveness in reaching her goals, including when and where to ask for help. Another interviewee gave their perception that "it takes experience to gain enough confidence to admit you are not getting something or need help" (Qualopec, 1:15:00). As a common-sense descriptor of most people and more specifically of most novices this statement may be accurate, but as hypothesis or necessary condition, Laura has already proven it wrong. And a novice that could break that stereotype has a far greater potential to contribute, as Laura did.

As per the previous category 2, category 3 (Open) also matched the expert characteristics categories very closely. Specifically, humility surfaced twice in direct reference to experts and was categorized under the expert category A and subcategory A2 (category A was described as Awareness of Self and Others applied to interpersonal and team communication & relations). Humility in this category is not used in the sense of self-deprecating, unassertive or subservient but instead in the context of lacking ego barriers, being open, unguarded and approachable. It was specifically mentioned with respect to being open to learning from others and learning new things.

Most of the references related to humility were actually descriptions of inverse characteristics—for example arrogance, ego, cocky—attributed to novice negative characteristics (along with too much humbleness in the sense of shyness or unassertiveness). When arrogance was attributed to veterans, it was usually in reference to the few veterans who survived by the luck of being able to come out on the positive side of the talent-to-grief ratio (though people still didn't like to work with them), because prima donnas would not normally be tolerated long enough to make it to expert status. It also came up that if a person held a high opinion of their talent or abilities and others agreed that this was a realistic assessment then that was not considered arrogant. Arrogance had more to do with a perception of unwarranted sense of superiority or superiority as a person. Similarly the perception of a prima donna had to do with a self-perceived superiority as a person or possession of some sort of higher rank that justified special privilege and treatment.

Confidence on the other hand was considered a positive key characteristic of experts. Novices would need to be careful of the fine line between confidence and arrogance and be very

aware of the team's perceptions and standards. Whether someone is arrogant or humble is a value judgment of their character; usually based primarily on the perceptions of behaviour.

Humility can be defined and promoted educationally, but pragmatically what is important is that the negative inverse characteristics don't hinder success and/or create dysfunction.

Therefore, what would be most important for educators is to create awareness about personal behaviours that trigger other people's positive and negative perceptions, and the situations where those behaviours would commonly occur. There is also a fine line between humility and self-debasement. Low confidence, as perceived through behaviours such as withdrawing and hiding, is nearly as negative to teams as arrogance. This brings the point back around to accurate self-assessment. That is what is critical. Based on the interviewee responses in this study I would recommend that educators facilitate student awareness of the difference between judgments of persons (innate value), whether of others or of self, versus assessment of behaviours by their outcomes; then facilitate student awareness of their own behavioural outcomes; and finally provide students with an awareness that they have viable choices for behaviour modification to achieve their intended results. It is the behaviours that trigger appropriate perceptions such as humility and confidence that are the key for both novices and experts, and not the accuracy or falsity of judgments (Rosenberg, 1999b).

Laura was described as egoless in the sense that she did not exhibit behaviours deemed arrogant or insecure. She didn't withdraw or hide but was freely open with her requests for help and input and thus about her inadequacies. Gandalf (her mentor) describes this as very rare. In considering why Laura possessed this rare behaviour both Gandalf and Laura's explanations centre on how Laura constructed her perception of the situation. Laura was motivated by a passion for the art. She chose to perceive her job choice as a goal in pursuit of her passion, and

she chose to perceive her work situation from a holistic perspective. In a sense Laura had a higher purpose than her ego protection needs. Her realistic self-assessment revealed her need for increasing self-awareness in all areas, including social awareness and interpersonal skills for effective communication and building of trust with others. The expert is characterized as having achieved a high level of holistic awareness, as evidenced by their ability to establish productive and pleasant relationships, but the novice can be guided into understanding the big picture and where they fit and what behaviours will assist them in achieving desired goals.

One of Laura's behaviours identified as exceptional was her unbridled or unreserved willingness to put 100% into whatever task she was assigned. Of course as a novice her participation was not expected to be as effective or productive or to have the same quality of results as an expert, but this behaviour promotes the perception of an approachable, caring, friendly collaborator, and thus increases trust, respect, and camaraderie. Once again, the differences between novice, advanced beginner, competent, proficient, and expert successful characteristics are differences of level and not of kind.

Regarding category 4 (Personable & Social) an expert's reputation may give them a higher degree of respect and benefit of the doubt than a novice will receive. The novice must usually earn respect through considerable and consistent results, especially with respect to production performance. But neither will be given much leeway with respect to interpersonal relationships and must earn a reputation for being someone people like to work with. Traits such as personableness and likeability are not typically thought of in the concept of expertise. I suspect that is because of the bias towards expertise being defined in technical terms, and because likeability is generally thought of within the domain of personality traits unrelated to education or professional development. It would not be surprising if a novice were to be

perceived as more naturally endowed with these traits than an expert; but experts in this study *were* specifically characterized as having these traits, so it is probable that there is some mechanism at work beyond simple personality traits.

Behaviours that trigger feelings of connection, trust, acceptance and friendliness in others could have been acquired through experience or training, or the work environment could act to filter out those without the characteristics, or both. Some interviewees did refer to both of these mechanisms. The previously mentioned talent-to-grief ratio and the Pixar firings are examples, and regarding poor team players and communicators one comment was that “after a while, they will either have been beaten up so much that they finally give up or they get out of the games industry” (Totec, 43:00). The situational context relative to the technology-skills life-cycle paradigm (see Chapter 1) is also relevant to the leeway given for non-personable behaviours. The value of technical or production competence exponentially increases with the level of desperation and decreasing options, while the value of personableness and fit remain constant. These are all important considerations for an informed holistic awareness from which to base decisions and focus energy and attention. The majority of students and novices will not have a level of talent or technical competence, nor be sufficiently qualified in an area of desperate need, that they will be able to ignore their behaviours that lead to the perception of personableness by the company and team.

If a student chooses to put 100% of their effort into developing a specific subject-matter expertise (SME) and skill, there is a possibility they can become so good that their lacks will be tolerated. An interviewee mentioned that some novices have spent so much time on their technical skills that they are actually better from day one on the job than many veterans. But consider the Pixar example and then consider the probability that a student or novice could

achieve such a level. Nonetheless adult students have the option of choosing such a path, and educators' obligations would not include judgments about them being wrong, or telling them not to pursue that path, but would be to inform them of the probabilities and realities so their decisions are informed and as realistic as possible.

Perhaps a weighted *skill need* variable could be added to the talent-to-grief ratio to make it more complete. The formula might be: $Talent + [(skill\ need) \times desperation] > (Grief \times C)$. $Grief = (negative\ behaviours \times weight) - (positive\ behaviours \times weight)$, where weight is the level of effect it has on the team. C is a constant defined by the company based on their values, because, everything else being even, some companies are willing for their teams to have higher levels of suffering. In this formula, grief is related to interpersonal or non-collaborative characteristics and includes the characteristics of humble or arrogant, personable or antisocial, open or closed, and so on. This type of formula might be a valuable tool for companies and educational programs to create awareness, language, and open discussion regarding common issues.

One difference between the novice and expert categories is that a typical novice would not have the breadth and depth of knowledge and experience to be able to communicate effectively across disciplines, as was identified as a characteristic of experts. This would be an area where education could contribute by exposing students to the bigger picture and specifically to the value of this ability. If it was deemed sufficiently valuable the curriculum could also include cross-discipline exposure to content, perspectives, and skills relevant to the area of expertise (or industry or job).

Novices obviously won't have the same level of holistic (category 5) understanding as experts, but for Laura the awareness of that difference, combined with the perceptual framing

and motivation to participate at that level, is a distinguishing feature of the results she achieved and would probably contribute significantly to the rapid development of her expertise. Both Laura and the experts have a meta-awareness (or a metaconsciousness) and a process for expanding and using it. But the experts' process is generally tacit and therefore it is not possible to ascertain if it is efficient. Expertise research depicting a long process of experientially acquired tacit knowledge, even with deliberate practice, provides evidence that a lot of expertise is acquired without the assistance of an aware systematic process that maximizes efficiency or effectiveness. This would certainly be the case in non-formalized complex environments such as the game development industry. But Gandalf distinguished Laura's learning as extremely quick and effective. Considering the resulting speed at which Laura advanced and was perceived as equivalent to advanced beginner, competent, proficient, or even expert, it may be that Laura's process is actually superior to the common process of expertise acquisition, and so the variables that empowered this type of learning are worth considering.

Laura first of all "owned" everything she was given. My understanding of Gandalf's perception of ownership in this context is that it refers to seeing the task, suggestion, or vision as a personal free choice and decision to take it on. Based on my conversations with Laura she was able to do this because she conceptualized her situation holistically as a step in the path to achieving her personal goals. Gandalf contrasted Laura with other students and novices in a description strongly reminiscent of Shor's (1996) description of "students' residual alienation and defensive withdrawals into the ordinary Siberian Syndrome, where they wait to be told what to do and what things mean, ambivalently desiring and resenting their own authority-dependence" (p. 148). Gandalf says that students tend to view assignments as external impositions or hoops to jump through. They don't actively seek relevance or ownership but

instead tend to follow orders or do the minimum necessary unless the assignment happens to align with their engagement proclivities and interests. Unless curriculum addresses this situation directly, or unless there is some form of external disorienting dilemma such as the possibility of failing or being fired, there is no reason to think this situation will change; unmotivated students will remain unmotivated and unquestioning.

Not only did Laura's perspective and behaviour increase her learning ability, it also changed her environment to better support her learning. According to Gandalf, Laura's behaviour as perceived by the team engendered connection and support. One mechanism at work in this situation could be

one of the most interesting ideas in the cognitive sciences ... people naturally assume that things in the world – including other people – have invisible essences that make them what they are. Experimental psychologists have argued that this essentialist perspective underlies our understanding of the physical and social worlds, and developmental and cross-cultural psychologists have proposed that it is instinctive and universal. We are natural-born essentialists. (Bloom, 2010, p. xii)

Since we generally expect people to act in a way that is congruent with our assumptions/beliefs/perceptions of their person and character, if we perceive that people are doing something because they feel they have to rather than because they really want to, then we tend to trust their potential performance and outcomes less (Medin & Atran, 2004). But if we perceive that people are doing what they sincerely want and desire to do we have a higher level of confidence that they will do their best in the situation and therefore their work performance and outcomes will be consistent with their expertise/ability level, given their constraints. This engenders trust and camaraderie (Gelman, 2003).

Gandalf elaborated fairly extensively on his observation of Laura's learning process. He says that Laura

came in and ... [said] "okay, what do I got a do" and you give her anything and she would just do it, and she would always always listen to you ... and she would take your idea, think about it, go away, she would do it, and then she would alter it, she would immediately pick up a different workflow, and come back and go "I took what you told me, and I kind of thought it would be faster to do it like this" and I'd go "that's brilliant" and then we'd build a pipeline together. She ... totally picked it up and she would redevelop it right away and make it her own, she would own it all the time, and that was rare.

Following are points and comments from this description.

- *Really listens*: Laura is listening to understand at a holistic level (as described later) and listening with an intention or agenda to be convinced and to improve rather than to gain advantage, be right, or defend ego identifications. Laura combined listening with a reflective practice that considered input from a holistic perspective. These principles worked together to empower Laura's learning and collaboration ability. Questions arising from this practice are more likely to be perceived as good, smart, and appropriate rather than challenging or argumentative. I think that Gandalf is describing something like this in how Laura listened and asked questions to clarify what she needed in order to contribute with 100% participation. Her listening behaviours may have been important contributors to the perception of her as respectful, humble, intelligent, and competent.
- *Takes the idea*: Laura takes ownership of the idea. She integrates it into her values and purposes and motivation schema. The context of that integration is that she has already integrated herself and her purposes into the bigger picture, or conceptualized the situation in a way that motivates her to participate fully, freely and openly.
- *Thinks about it*: Reflective thinking.
- *Goes away and implements the suggestion or task*: Uses an empirical process.
- *Alters or redevelops it (and makes it her own)*: Uses an empirical iterative experimentation process that achieves her purposes.

- *Improves the workflow*: Gandalf calls Laura “smart.” In context I think this refers to Laura being a holistic problem solver who operates at a higher level than others, that is, she analyzes problems at a systems level, such as pipelines or processes, and improves on the system rather than just getting a job done. Another interviewee spoke of this in context of an ideal employee who would be seen differently from

higher ups [who] would want punctuality on deliverables. Production people would want someone who tries many things, even if they are late on something they have tried many things and found new workflows and improvements, they have really given it their all. Someone who looks good on paper would appeal to the higher ups. (Marco, 28:30)

- *Come back and communicate*: Practices collaboration and pro-active communication.

Gandalf elaborated further:

she pushed the envelope, though she was still learning she would gain experience as you were showing her how to do something. So if you showed her how to do something she picked it up really fast. The experience part would also kick in and she would start to gain experience just by being there and seeing how everything worked and she was like going “you know what, I know how this system works, I know how you guys communicate, I have to be at that level” so she was kind of turning over getting experience as she was there and she was able to reprocess. (36:00)

- “She pushed the envelope:” as a learner. This is not a process but perhaps speaks to the drive that is being fuelled by passion. I take this to mean that Laura’s drive to learn constantly pushed the boundaries of her own and other people’s knowledge and assumptions. When that kind of thirst is combined with an aware learning process that seeks holistic understanding, it is perceived as pushing the envelope. Laura was focused on becoming a contributor and recognized the need to grow and learn rather than being focused on proving, impressing or avoiding as some other novices were prone to do.
- “Gain experience as you were showing her ... gain experience just by being there and seeing how everything worked:” It is clear that Laura learned by observation, but that she could also gain experience while being taught. This could mean that Laura was able to accept what she

was being taught as her own new experience. Research into improving cross-discipline transferability of expertise implies that Laura had a metasystem of seeking and making connections and/or a large web of cognitive associations already in place (Bransford et al., 2000; Bransford & Stein, 1993; Hatano, 1982). The reference to learning and acquiring experience by participation and observation would be an indicator that she used reflective thinking and action (Dewey, 1991).

- “Seeing how everything worked:” She observed holistically, both the system and the team. Her holistic model kept expanding to integrate the new knowledge and experiences of the situation and her place and path within it.
- “I have to be at that level:” She was determined to be at the level she observed and decided was the standard. Laura self-assessed her performance and communication accurately relative to the team standards and applied her motivation to defining those standards and achieving those levels.
- *She had the ability to learn fast and to remember.* Overall Laura’s system was effective in distinguishing her as a fast learner.

I categorize the description of Laura’s practice above as *reflective thinking* because of the strong parallels it has with Dewey’s model (see Figure 1) and because of my perceived value in Dewey’s model for understanding the type of learning and framing that Laura seems to be exhibiting.

Compare Dewey’s model to one interviewee’s description of what he does.

At the end of the day, that is what game development is really about, it’s experimentation. ... I’m experimenting here and prototyping as quickly as I can to prove or disprove assumptions, iterate on that a few times and once you lock in and go yep, this is going to work, then you go on and try to nail it and put it in production. (Chan, 46:00)

Dewey (1991) sees the experimental method as the most adequate method of natural reasoning within reflective thought and the most reliable and natural method of counteracting the faultiness of perception and its proneness to error. The epistemological alternative is dogmatism, prejudice, or tradition. If “actions are not guided by thoughtful conclusions, then they are guided by inconsiderate impulse, unbalanced appetite, caprice, or the circumstances of the moment” (p. 67), and reflective thinking “alone is truly educative in value” (p. 2). The reflective experimental process is also inherently holistic. “As intelligent beings, we presume the existence of meaning ... All knowledge, all science, thus aims to grasp the meaning of objects and events.” This can only be done by situating them in the context of a larger whole “which, in turn, accounts for, explains, interprets them; i.e. renders them significant” (p. 117). Dewey’s ideas on reflective thinking and learning have been applied in Schön’s (1987) reflection-in-action perspective and other work on reflective practice.

Another interviewee brought up a learning model that is relevant to expertise and the current discussion. It is known by many names: competence-cycle, four stages of learning model, conscious competence learning model, conscious competence ladder, conscious competence matrix, and the conscious skilled and conscious unskilled models. It is popular in folk psychology, coaching, and counselling, probably due to associational logic that aligns with many peoples’ experience, and it is often applied to expertise for the same reason. The model has 4 stages:

- 1 - Unconscious Incompetence -> 2 - Conscious Incompetence ->
- 3 - Conscious Competence -> 4 - Unconscious Competence

Expertise is seen to be developed through repeated practice until Stage 4 is reached where conscious thought is no longer required and doing is automatic. Based on this model

Laura as a novice was probably at Level 2 while most novices would probably be at Level 1. This model lends itself more to a skills-based concept of expertise than to subject matter experts (SMEs) or the definition derived from interviewees, but there are many suggestions that the model can be applied without the staged aspect and many proposals for a 5th stage (for example see Chapman, 2003-2010) that might improve the applicability. I have my own suggestion for a 5th stage that I would label as Metaconscious Competence. This label implies an awareness (able to observe the level and quality) of the awareness they have of their competence and seems to me to align closer to the type of novice expertise and reflective thinking/learning practices that describe Laura. It also parallels Dewey’s reflective experimental thinking and moves the model closer to a holistic perspective.

Dewey’s reflective thinking model does not require metareflection to be at the end of a staged process. Instead Dewey’s model is nonlinear with respect to the objects of reflection. Therefore, perhaps adding a MetaConscious dimension to each stage of the Competence-Cycle model would allow it to better explain what Laura represents. Table 35 is an attempt to illustrate how this might look. The MetaConsciousness dimension is labelled as the Consciousness level of Holistic Perspective (aware of the value of one’s own holistic perspective), and for simplicity sake, the numerical meanings for the competence-cycle model are used:

Table 35: 5 Stage Conscious Competence Model with Added Levels of Holistic Perspective		
Consciousness level of skill or task Competence		Consciousness level of Holistic Perspective
		1 UnConscious of nonHolistic Perspective
		2 Conscious of nonHolistic Perspective
		3 Conscious of Holistic Perspective
		4 Unconscious of Holistic Perspective
1	Unconscious Incompetence	could be at level 1 for skill but 1-4 for holistic perspective
2	Conscious Incompetence	could be at level 2 for skill but 1 - 4 holistic perspective
3	Conscious Competence	could be at level 3 for skill but 1 - 4 holistic perspective
4	Unconscious Competence	could be at level 4 for skill but 1 - 4 holistic perspective
5	MetaConscious Competence	could be at level 5 for skill but 1 - 4 holistic perspective

Combining the two models produces a process with stage levels for the development of holistic perspective and skill competence until expertise is reached for the given competence at stage 4. If the iterative process is continued the expertise may be able to move into a metaconscious level, which could provide a perspective from which to apply the competence to previously perceptually or experientially unrelated areas. A novice, advanced beginner, competent, or proficient could conceivably develop a set of core skills, say at level 2, along with a level 4 or 5 holistic awareness (of consciousness levels) prior to their arriving as a novice in an industry, profession or discipline. A person in this state would probably be able to more quickly acquire competence and expertise than a person without this level of holistic consciousness.

It is much more likely for industry veterans to reach a level 5 holistic perspective as well as levels 4 or 5 in numerous skills and abilities. These would be highly valuable people. For example, applying the level 5 reflective thinking metaexpertise concept to learning, an expert lifelong learner would be one who understands their own significant learning variables and is able to adapt and apply their expertise for maximum efficiency and quality of learning across situations and environments. A seasoned-veteran expert-lifelong-learner would be a more meta-level expert than someone who has learned how to learn new technologies or software (a requirement of success in the game industry and an often mentioned characteristic of successful veteran experts).

This meta-expertise context provides an interesting perspective for viewing data from my research. For example, Gandalf describes being a novice to games and to EA but EA management put him in charge as a mentor over Laura when he had been at the company for only a little over a year. This may speak to the previously mentioned concept of specific experience having far greater value over other types for the development of expertise. A similar

perspective is evident when companies privilege not only games shipped but also the success of the games shipped when considering their ideal hires. Laura mentioned that it is attractive for companies to hire great novices with fit because of the cost savings, but they still prefer to hire or steal people with experience from other companies and industries if they can justify the cost. If the hires are from a different industry, they would then still have to train them. But the assumption is that the training required for someone with related experience, or any professional experience for that matter, is far less than for new graduates. Why? The meta perspective could explain why some experts do no better than rank amateurs in new domains while others are able to transition into new situations and industries and apply their database of knowledge and habits to quickly and effectively acquiring expertise. A meta-level expertise is by my definition one that is consciously (reflectively) making associations with broader, deeper, more complex and pluralistic environments, and more serious situations with increasingly uncertain solutions. As for the perceptions of games industry production people, there was generally agreement that novices and experts alike must be able to learn and grow and adapt quickly and deeply if they are to succeed or even survive long in the industry. They must become *expert learners*, or in a sense, lifelong experts at transitioning from novice through advanced beginner, competent, or proficient in various areas and fields.

What would it mean to become an expert at becoming an expert? An expert at acquiring expertise? An expert at being able to master skills and abilities? An expert at the competence cycle or, said differently, an expert at the novice-to-expert cycle: an expert learner? These are questions that I believe are of significant value to explore after considering how Laura may exemplify such expertise.

As previously mentioned the expert or proficient will receive some benefit of the doubt that a novice won't, therefore consistent results are important for the novice to demonstrate in order to build trust with the team (Table 34 category 6). Results include quality of work as well as behaviours such as perseverance and dependability. Laura was described as "a trooper" with a consistent temperament and consistent dependable results even when she was down, stressed or sick. A characteristic of experts was consistent confident calmness no matter what the circumstances or how severe and complex a problem. Beyond personality this characteristic was based on having seen and survived, or perhaps even fixed, similar or worse problems and situations before. Because of this team members typically look to experts for various levels of help in times of stress and need. I doubt that the team looked to Laura for this or would do so with any novice, but Laura was creating an expert reputation in this regard by consistent demonstration of advanced beginner, competent, proficient, and expert traits (including constantly pushing the boundaries of her holistic perspective and problem solving) and work results.

It is unrealistic to expect a novice's absolute quality of work to be equivalent to an expert's, but a sufficient quality is a requirement. Interviewees and other sources in this dissertation have identified that students and novices often focus on their technical expertise to the exclusion of other professional expectations for many reasons that may include simple avoidance of unpleasantness. But this was clearly not the case with Laura. Her passion for quality in her chosen artistic path and goals was matched by her realistic and holistic assessment of herself and her situation. With regards to the importance of nontechnical characteristics, there was evidently no ignorance, denial, illusion, or avoidance.

It seems logical that to best prepare novices for entry into the work world professional expectations must be taught and practised within the curriculum, but professional experience is not an absolute requirement for acquiring a professional demeanour as evidenced by Laura. Rather, a professional demeanour requires an understanding and commitment to the values, behaviours and deliberate practice that develop habits of thought and behaviour perceived as appropriate for the industry or company and the team's professional expectations.

It will be much more difficult for a novice to prepare for realities (category 7: Mentally Aware & Prepared for Realities) than it is for an expert who has experienced most of the realities first hand. This is an area where education can provide significant value by guiding students through a broad range and depth of vocational realities in a way that maximizes experiential reality, for example in simulations and case studies with authentic situations and variables, guided by expert veteran mentors. In order for such experiences to be predictably effective the student would need to have acquired, prior to the experience, a perspective, ability, and practice of self-initiated commitment to discovering and accepting reality (non-resistance) and assimilating or accommodating appropriately (requiring non-judgment and non-attachment), or the development of those characteristics needs to be built into the guided experiences of the curriculum.

One of the realities Gandalf brought up was what he called the "hammer," which represents the negative responses and system restrictions on unrealistically enthusiastic novice expectations or efforts to contribute and be creative (at high levels, not just doing their job). He describes how most novices arrive with enthusiasm but then they

get slaughtered in their first year ... get smacked down ... the chains get shackled, and you see their attitude and passion just wither away. ... Everything runs in your head like "we can do this, we can do that," and you go to the meetings, and you're all excited ... and they tell you "you can't do that, you don't know what you're talking about," and

after a while you just go okay this is an assembly line, I'm in a factory, there's no creation going on here. I just go to do my job. ... For the big company, big production, you're not there to change how they do things you're there to be part of the assembly line, and your job is to do your job and don't deviate from your job ... it's very rigid. ... Usually it's your mentor who tells you...you don't have that much freedom. ... So many times ... new people come from school and they get this idea in their head they're there to be part of the production and they are going to have a voice and they can help make a difference but that doesn't happen. (19:30)

Gandalf said that he mentored Laura by being very clear about the reality of Laura's situation and the best (the expert) way to deal with it. Of course other novices are given such advice without such dramatic results, but Laura had a perspective and reflective process of thinking that allowed her to accurately assess the advice in the context of the situation and make it her own without any "ego," as Gandalf says, by which I understand him to mean Laura had no ego identifications, such as superiority or entitlement, that she had to defend and would sabotage her learning or interpersonal results. Laura may also have had an easier time accepting and navigating the "hammer" because she had an overall greater awareness than other novices. Her passion and goals drove her to research and explore as much as she could, and she very likely already knew that she would have to start at the bottom, pay her dues, and earn respect, trust, and advancement.

Expert Learners Compared to Exceptional Novices

After describing the exceptional novice characteristics and considering the potential power in the concept of teaching for that outcome, I spent some time researching whether or not similar ideas had been proposed. There were striking parallels with the capability model mentioned in Chapter 2, for example "capable people ... are more than competent. They are creative, know how to learn, have a high level of self-efficacy, can use competencies in novel as well as familiar situations and work well in teams" (Hase & Davis, 1999, p. 1). I also found a

generic doctorate at Middlesex University that focuses on developing what is essentially the capability model for practising professionals (Doncaster & Lester, 2002).

One relevant concept that applied to youth came out of research in the 1970s which began with the question of why or how a small percentage of students had superior learning competencies to other students. Researchers were able to identify specific distinct characteristics that were attributed to these students' ability. Bransford and Stein's (1993) IDEAL model of problem solving grew from that original research

There are various labels given these exceptional learners, including *intelligent novices* (Bruer, 1993) and *expert learners*, who are described by the key characteristics of being strategic, self-regulated, and reflective (Ertmer & Newby, 1996). Other labels include self-regulated, intentional, self-directed, autonomous, metacognitive, and strategic. All of the models recognize most of the same characteristics that were described as belonging to Laura, including having self-defined goals and plans for achieving them (for instance, what has been referred to in this study as a definition of success and goals based on passion), and metacognition. Most of the models (Bruer, 1993; Ertmer & Newby, 1996; Perkins, 1995; Rahman, Mahmud, Yassin, Amir, & Ilias, 2010; Zimmerman, 2002), particularly Ertmer and Newby, and Zimmerman, are also aligned with Dewey's model (previously presented) and recognize the critical place of reflection and experimental action.

Just as many interviewees in this study brought up systemic issues with the current educational system, many of the authors researching expert learners discuss the systemic obstacles and resistance to the development of self-regulation. There is general consensus that students can be taught to be expert learners but that students are generally not being taught. One study concluded that

strategy instruction [on self-regulated learning] occurred only 9 percent of the time [but] ...based on research on the development of related skills, researchers estimate that students will need at least several years of systematic strategy instruction to become highly proficient self-regulated learners. (Snowman, McCown, & Biehler, 2009, p. 290)

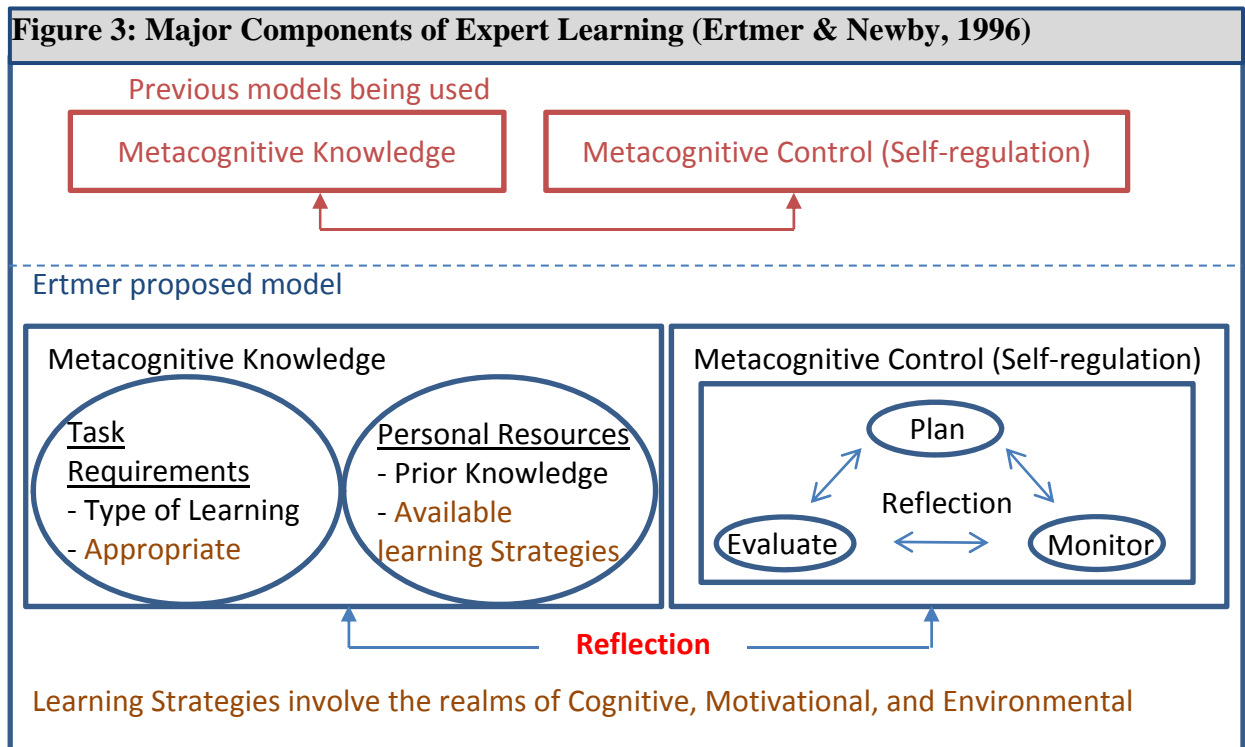
Ertmer (1996) says that

researchers today would agree that most students do not develop learning strategies unless they receive explicit instruction in their use: learning how to learn cannot be left to students. It must be taught ... [but] reflective inquiry and metacognitive skills are not learned by listening to a lecture or reading a book. (p. 19)

Bransford, Brown and Cocking (2000) also describes research from 1997 that revealed a parallel with negative novice characteristics based on the common implicit assumption that an expert is someone who knows all the answers, and he described how that model negatively impacted student learning through authority-dependence and fear of inadequacy (entity theory). Just as in the novice negative characteristic in this study, students in those studies tended to worry about proving competency and avoided admitting their need or asking for help, which were important expert learner behaviours. The study found that performance outcomes improved when students reframed the concept of an expert from someone with all the answers to someone who is accomplished, and advanced, competent, or proficient.

One of the concepts under-addressed in the expert learner literature is motivation, which is mentioned as necessary but almost as a minor point assumed to be both common knowledge and commonly or easily dealt with. In my study a number of interviewees mentioned a lack of student and novice motivation, and a lack of self-initiating behaviours was one of the common negative characteristics. In the exceptional novice description, passion was proposed as the base and fuel that motivates all else. Dewey (1998) argued that formal education should be practical and based in (and thus relevant to) the real world of the learner. In Dewey's model, motivation to learn is integrated into the content of learning as a felt need arising out of the environment and

situation. North American public educational systems do not generally follow Dewey’s proposals.



When content and method are divorced from the learner’s real world, educators become burdened with the added need to define content value, relevance, and paths to acquisition, and to persuade students of the relevance of what is perceived as fully abstract content and hope that learners will be motivated to participate fully. But external motivation can be very difficult to implement effectively. I believe most instructors will recognize the teachers’ claims in Rahman’s (2010) study in which interviewees said that students

“depend 100% on teachers ... they are not ready to learn. ... No self initiative ... Just waiting to be spoon-fed ...” One female teacher pointed out that she has to be a “step mother” to get attention “I give warning to them...if they don’t pay attention, they will be punished.” (p. 3)

Since the educational system and content are separated from everyday life and relevance, the socio-political system has devised various means to motivate students to learn, including reward and punishment, “social encouragement and extrinsic bells and whistles” (Zimmerman, 2002, p. 66), and constructing connections to consumer commercial ego satisfactions, that is to say getting jobs and making money in order to have a high quality of life and prestigious lifestyle.

Even passion gets dragged into the commercial commodity framework. Based on the exceptional novice description, passion is the foundation of motivation and should be explicitly sorted out and operationalized in preparing people for expertise acquisition. Unless it is specifically sorted out and students are guided or mentored through a process of self-identified passion-based goals, the tendency will be towards the negative novice characteristics of superficial and unrealistic passions that are not sufficient to build careers and lives on. Passion satisfaction becomes commodified as a job purchased through school. Once educational content is removed from direct lived experience and no longer arises out of direct need in the real world, as Dewey argued, academic goals are by definition abstracted and therefore divorced from real-world goals. Even if academic goals are perceived as steps to higher-level real-world goals, for example getting a letter grade of *A* in math because it will mean being able to get into a higher level CS class, which will mean having a specialization that may increase chance at getting a good job, the goal of getting an *A* is an abstracted goal. There may be expert practices and strategies for achieving the goal that may be important for, and work within the model of, an expert learner being successful in school, but they may be of no value or may actually be dysfunctional in the world of work, society and relationships.

Another major difference between expert learners and exceptional novices is interpersonal and social skills. The expert learner model is based on learners in a formal

education model focused primarily on curriculum knowledge acquisition, in classroom environments, and with the autonomous ideology. Characteristics of expert learning are generalizable, but characteristics required for expert learning in school have gaps similar to employability skills gaps when it comes to being an expert at learning at work, especially in a collaborative team production environment. Interpersonal, social, emotional, and collaborative skills are extremely prominent in the exceptional novice characteristics but not prominent in the expert learner description.

The third major difference between the expert learner model and the description of Laura is based on the characteristics 7b, 7c, and 7d: non-Attachment, non-Resistance, and non-Judgment. I described these subcategories with terminology that is sometimes used in spiritual practice in order to draw attention to the parallels many of the concepts coming out of the research have with spiritual practices and concepts that are commonly considered outside of public education's purview. This is particularly the case with respect to practices focused on creating calm confidence and developing healthy meaningful relationships.

The parallels between the concepts 7b-7d and much of the literature on expert learners are clouded because of the tendency for the expert learner literature to focus on discovering and teaching specific skills and strategies that expert learners use, for instance reciprocal teaching (Bruer, 1993), rather than focusing on characteristics such as perspectives/beliefs, interactions, and habits of thoughts and mind that expert learners would function with in situations, and which are the focus of the description in 7b-7d. For example, Bruer (1993) says that "comparing experts with novices makes it possible to specify how experts and novices differ in understanding, storing, recalling, and manipulating knowledge during problem solving" (p. 4). Bruer's focus is typical of expertise expressed as skills rather than the underlying characteristics

that motivate and promote expertise. If expert learners differ from other learners by being more curious, for example, what is the basis of that curiosity? Why are they curious? Are they curious about all things or just certain things? What do the non-curious do if they are not curious? Perhaps students need to be guided into finding their passion and bliss, and then focus that passion on goals and ways of being that produce flow as a state that produces higher levels of long-term happiness than will the pursuit of jobs, money, and consumption.

Characteristics 7b-7d for Laura are not mentioned specifically as categories in the expert characteristics in this study. But they are definitely not antithetical to the expert characteristics or to the expert learner characteristics, and are arguably implied by aspects of each. Expert, proficient, or competent characteristics that imply these characteristics include humbleness, openness, willing to learn from anyone, welcoming to input and not defensive, and collaborative focus on what is best for the team rather than self-interest (or being right about a position). Zimmerman presents eight component skills of expert learners (see Table 36), which include the restructuring of physical and social context to align with personal goals, and adapting future methods for improved results. These skills have some implications for non-Attachment, non-Resistance, and non-Judgment in relation to a person's willingness and ability to let go of physical and social relationships through a metacognitive perspective. Characteristics 7b-7d are also arguably implied by Dewey's model of reflective learning combined with his pragmatic perspective of fallibilism, in which empirical results are accepted and weighed by the evidence of their effectiveness, regardless of the clash they may have with personal belief systems; and changes to behaviour are made based on those findings.

Table 36: Characteristics of Expert Learners	
(Zimmerman, 2002) expert learner skill components	(Ertmer, 1996) Characteristics of expert learner performance
setting specific proximal goals for oneself	experts know more and knowledge is better organized and integrated
adopting powerful strategies for attaining the goals	have better strategies and methods for getting to their knowledge, using it, applying it, and integrating it
monitoring one's performance selectively for signs of progress	different motivations
restructuring one's physical and social context to make it compatible with one's goals	tend to do things in a more self-regulated manner
managing one's time use efficiently	more aware of themselves as learners
self-evaluating one's methods	learning is reflected upon more
attributing causation to results	more sensitive to the task demands of specific problems
adapting future methods	more opportunistic and flexible in their planning and their actions
	more aware than novices of when they need to check for errors, why they fail to comprehend, and how they need to redirect their efforts

Chapter 6 – Implications for Further Research

The analysis presented in Chapter 4 provides evidence that the perspectives of game developers significantly match the results from the literature on employability. A next step in this research could be a widespread survey of the games industry used to try to validate the categories and concepts that emerged. Validated material could then be used to design curriculum to address the resulting outcomes and that curriculum could be tested for effectiveness in controlled experiments with industry participation. Such an approach would be common to applied research. But the results and analysis from the literature review and this research have brought up concerns about systemic issues in education that, if valid, might render a traditional application of the results mostly ineffective. In addition, there are potentially game-changing cultural and demographic shifts that are growing in importance and impact. In considering alternatives for improving vocational education effectiveness, it may be better to end-around the system than try to introduce changes that require structural change for success. If an alternative could be built that would take advantage of electronic communications such as social media and delivered via the Internet, it might have a better chance of success. In addition, if an alternative could be built that facilitated the acquisition of perspectives and habits (of mind and behaviour) characterizing expertise acquisition, the probability that graduates will meet the needs of the work world and their communities and will have long-term success might be greatly improved.

For those working within the system I highly recommend the Conference Board of Canada's (2003b) report as a basis for developing curriculum or other educational interventions, policies, or systems. It presents a well-researched, thoughtful, thorough, and holistic perspective on the issues and solutions, with practical suggestions for the types of changes that have a

chance at being successful within the system. I don't feel I could improve on that report for those purposes and so I defer to it rather than redundantly cover the same material.

The Deweyan model incorporating *reflective thinking* and *intelligent action* previously presented captures many of the key elements that describe novice acquisition of expertise in this study. This model, which I will refer to as *educative experience*, may be effective for applying research results from this study to alternative curriculum development that focuses on the acquisition of expertise, in addition to knowledge and skills in any field, but specifically in this dissertation, for game development.

In the context of applying *educative experience* to this research I see two related processes being required. The first of these is environmentally adaptive and holistically progressive transformations (for example, Piaget's accommodation or more holistically Kegan's level transitions), which are typically prompted by disorienting dilemmas in which the learner perceives the current system as inadequate for sufficiently handling the dilemma. The need to resolve the inadequacy motivates transformation of perceptions, abilities and beliefs into more adequate higher levels, as evidenced by the ability to handle increasingly more complex situations. *From a curriculum perspective, this describes a transformative objective and methodology.* The second process involves grappling with a sufficient number of relevant (meaning authentic to the environments and situations) and diverse just-beyond-manageable situations in a sufficiently short time such that a sufficient breadth and depth of schemas and knowledge are constructed (large and diverse connections) sufficient to apply to a very high percentage of situations the community (or members) would encounter in the environment. *From a curriculum perspective this describes an experiential methodology such as a game based simulation.* With respect to the conclusions on curriculum *content and outcomes* from this study,

an alternative curriculum would require two foci, at least for vocational game development: 1) a competency outcome of *core expert characteristics* as the foundation, with technical skills as the mandatory but secondary prerequisite largely acquired through the process of developing the expert characteristics (rather than the other way around); and 2) an experiential methodology where *learning occurs by doing within authentic mentored experiences* using reflective experimental processes.

Alternative Educational Content and Outcomes: Expert Learner

The exceptional novice or expert learner description in Chapter 5 provides the example for the *educative experience* model in action within real-life situations. Laura perceived her systems to be inadequate and consciously chose to pursue transformative self-directed and self-managed education. That meant that she was willing to practice non-attachment, non-judgment, and non-resistance. Her disorienting dilemma was the gap between where she realistically assessed herself to be and where her passion goals indicated she passionately chose to be. This dilemma led to action plans in which incremental steps included identifying and conquering incremental gaps as she faced them and holistically contextualizing them in order to identify and mentally prepare for the next steps (the next gaps, or next level of situation or next way to create an appropriate next level disorienting dilemma). Because she was following a reflective practice within the actual environment of her passion goals, all experiences were relevant.

In considering the application of these concepts to the competency outcome of core expert characteristics as the foundation for a curriculum, I believe that a focus on the concept of expert learner could be valuable, and this potential was validated through this research. What might it mean to learn to become an expert at becoming an expert? The term *expert learner* reverses the goal of being an expert to being a specific type of learner. Identifying oneself as a

learner implies a self-aware and humble frame of reference. Expert implies a significant amount of deliberate practice, depth and breadth, serious rigorous study and experience, and a lofty minimal bar of competence in the area of expertise; in this case, being a learner. So, being an expert learner would start with the responsibilities and accountabilities of the person/student/novice.

In this study, it is argued that one of the common issues that novices need to avoid is an over-confidence that comes across as arrogance. Novices consciously or unconsciously adopt aims to acquire the characteristics to become advanced, competent, proficient, or experts in the mid- to long-term and are challenged to avoid the common mistakes that lead to them being looked down on as novices in the short term.

A commonly held position (previously referenced) is that people cannot reach expert status without years of practice and experience. Accepting that position (for now, though it needs caveats and variables applied to it to be practically valuable for education) there is nothing in the perspective or the research indicating that novices cannot embody the foundational characteristics that distinguish and support expertise. Like Schön's reflective practitioner and Dewey's folk scientist, disciplinary expertise requires something like a Stage 5 metaconscious competence level or reflective competence.

Experts embody key competencies as holistically conceptualized by the DeSeCo model of the OECD. In the DeSeCo model (Salganik & Rychen, 2003) competencies are "the ability to successfully meet complex demands in a particular context [work and life] through the mobilization of psychosocial prerequisites" (p. 43). Competence includes all of the key (generically necessary) skills, knowledge, attitudes, and values, whether cognitive, emotional, motivational, ethical, volitional, or social (Kearns, 2004), that are required to do something, and

increasingly, that means doing something in complex environments and situations requiring specific psychological and social competencies. No single or minimal set of abilities or characteristics is sufficient for competency. Basic skills such as literacy and numeracy are of course necessary, but they are already well defined and agreed to in North American public education and have been in the official curriculum for a long time. An expert learner concept is a transition to adult work and life concept that, just like work, expects a base level prerequisite of skills for functioning in society. Built on that foundation, expert learner skills are focused on basic skills for long-term success in work and life and “a well-functioning society” (Salganik & Rychen, 2003, p. 5).

I believe that results from this research suggests a possibility that a set of foundational expert characteristics might be able to be defined for a large set of industries and used as curriculum outcomes for expert learners. My rationale is as follows: First the expert learner skills are simultaneously generic to common needs across industries (as exemplified in the employability skills and this research) as well as being specific to characteristics of the object of that need, by which I mean becoming an expert, as opposed to employability skills that attempt to define a generic entry-level skill set for novices entering all manner of work situations. Second, the research results corroborate expert learner research but address some significant gaps that could make the concepts more applicable to work environments. If it *is* possible to define the characteristics, then framing those characteristics to focus buy-in and participation from industry, government, public, parents, and students, in the context of an expert learner, is a concept with pragmatic validity and beneficial effects. It is a concept that could be used by various communities of enquiry to make sense of why vocational skills training and university

liberal arts training are both perceived as inadequate by many in their communities; and it could be used as a clear recognizable target to focus on.

As a target the expert term demands attention to a set of standards for practiced and demonstrated characteristics of expertise that form the base for a novice standard skill-set and knowledge base, and that could (and hopefully would by agreement) require assessment based on pragmatic principles of democratic participation by all stakeholders. It would also shine a light on veterans in any area or industry, because just as being a novice has no necessary correspondence with expertise qualities or abilities, neither does being a veteran (at least not in the sense that expertise is being discussed here or by Dreyfus and Dreyfus [1986, 1999, 2004]). In other words, I suspect that many veterans could benefit by having an explicit set of expertise characteristics to assess themselves against and possibly use for growth. Perhaps such a set could have helped the Pixar terminations.

I propose that graduating expert learners would be a much more effective and higher goal for private vocational education than graduating technically trained entry-level workers. Entry-level skills would still be standard fare for all expert learners, but currently the work world perceives graduates with entry-level skills as having significant gaps for becoming long-term successful veteran experts or, in many cases, even for short-term effectiveness. The *conscious competence* learning model was presented previously, with a fifth level corresponding to Dewey and Schön's concepts of reflective practice. In that model, students entering a program would typically be at Stage 1 and the school's goal would be to transition them into Stage 2 with a foundation that will support efficient progression through to Stage 5 of the expertise characteristics. Along the way, the technical skills will be developed because doing the specific job is the context of the expertise acquisition. This is generally the exact opposite of the current

educational system, especially those without adequate apprenticeship, internship, co-op, or service learning experiences.

Among the many obstacles to a proposal such as this, as previously mentioned, is a general scepticism that schools can teach soft skills and that soft skills are secondary to hard skills for vocational education. As well, my experience is that students commonly perceive others to need soft skills, but not themselves. Laura says “there were a few classes on soft skills but no one wanted to take them” (18:16). Janice expressed that she didn’t need them but others did (although that may be a bit out of context because she was primarily referring to basic skills like resume writing, which speaks to the common confusion of equating soft skills with basic life skills). The *above average effect* (Burson et al., 2006; Chambers & Windschitl, 2004; Kruger, 1999; Kruger & Dunning, 1999) may play a part, in this case, for students who are at stage 1 of the *conscious competence* model and are not simply unconscious about their level of relative incompetence, but actually significantly overestimate their level of competence in soft skills as compared to their peers and generalized others (Mead & Morris, 1934). Other cognitive biases contribute to this situation, for instance the *self-serving bias* is the tendency to attribute positive outcomes to self and negative outcomes to external factors, but to reverse the attribution for the outcomes of others.

Word associations and preconceived concept biases can also have a significant effect, even through items as small as the name of the program or of the content itself. For example, it would be an understatement to describe student reaction as resistant when the Centre for Arts & Technology (my current employer) implemented a *life skills* program in all of its subject areas. Intense indignant anger accompanied the formal and informal complaints. The lack of qualified and exceptional teachers for the courses added significantly to the problem. The colleges chose

to address the issue by a national search for instructors and training programs, along with increased education and counselling for students prior to enrolment and in the programs about what life skills were and how they were relevant, applicable, and necessary. This resulted in some improvement but not much. The biggest gains came afterwards when the program and course names were changed to *professional development*. Students were willing to accept curriculum in professional development but not life skills, irrespective of the content.

There are currently many names, concepts, programs, and practices or applications used to refer to a similar set of soft skills: *life skills, essential skills, basic skills, work habits, transferable skills, generic skills, employability skills, generic employability skills, core competencies, key competencies, soft skills, 21st century skills, innovation skills*, etc. This can be confusing for students, teachers, and administration. Some confusion may arise from the ontology underlying the terms and the outcome differences, some from the methodologies and practices associated with them, and some just from the number of names. Regardless of the name they use, programs in these areas will almost certainly share the issue of acceptance by students and teachers. Most of them will also face other common issues such as insufficient resources and training; systemic obstacles and resistance to implementation and integration into curriculum; a lack of clarity on how to measure results; and a lack of clarity on how to iterate learning back into the process for incremental improvement.

Some confusion also arises when there is no clear differentiation between characteristics such as basic life skills, employability skills, abilities, attitudes, and behaviours. It is pretty clear from the many lists of skills that employers rate as high, that many skills are mentioned because expectations about basic life skills are not being met. Being able to converse on a phone, write a memo, and do math would not show up specifically as employability skills if novices were not

showing up without these skills. They are a norm (or at least have been considered in the past to be) for functioning successfully in North American society and are generally expected of the average North American. Basic life skills have been introduced into some curricula but are poorly received in general and often perceived by students and parents as valuable only for the below average, disadvantaged, at-risk students, which of course, clearly applies to someone else (Chickering & Reisser, 1993).

These issues draw attention to the obstacles faced by many educators, but specifically to those educators trying to implement the type of non-technical skills education of youth programs perceived as vocational. Following is a proposed alternative methodology that may have great potential for overcoming such obstacles.

Alternative Educational Methodology: Epistemic Game Simulation

I propose that simulations might be one of the most effective alternative instruments for accelerating the development of expertise based on a number of their fundamental characteristics. Most importantly, simulations can simulate actual environments and situations, as well as focus them specifically for the desired advancements and the developmental level of the participants. Simulations can also be designed as integrated curriculum, content, and methodology. In addition, they can be staged for increasingly more difficult and complex (including diverse and intricately connected) real world disorienting dilemmas and challenging problems to solve. Where else could this happen more efficiently and affordably? In the real world, whether in apprenticeships, work experience, or on the job training, situations do occur but the variables can't be controlled. They may be way below or beyond the ability of the learner, they may come all at once without enough time to reflect, and they may have costs and

consequences too severe for the type of experimentation and experiential learning that development requires.

Expertise research (Ericsson, 2000a) has demonstrated that deliberate practice escalates advancement faster than mere observation or random trial and error; and more so if guided by a superior mentor. Developmental research has evidenced the need, as postulated by Kegan (1994) and Kohlberg (2011), for a challenging environment and challenging situations for moral and cognitive development. I see simulations as the most appropriate practical instrument for significantly speeding up the process of development, but even if attempted simulations prove inadequate for directly facilitating development, then at a minimum they will increase the probability that the learner will develop quicker within the work environment by having focused attention and awareness on what expertise acquisition will require from the learner's life and work experience (e.g., constructive intelligent experimentation and deliberate practice).

My assertion regarding the potential of simulations extends beyond vocational competency and development. It includes effectiveness for simultaneously facilitating academic liberal arts goals, humanistic personal development goals, and pragmatic democratic social goals—for example autonomous, balanced, disciplined, self-motivated, self-directed, self-managed learners who are clear about what they want and how to achieve it—through explicit facilitation of transformational learning, self-awareness, and critical perspectives. My position is based on research in many fields including expertise (e.g., Dreyfus & Dreyfus, Schön, Ericsson), experiential learning (Dewey, Kolb), transformational learning (Mezirow, Brookfield, Kegan), epistemic game based learning (Shaffer, Gee), adult development (Hoare), and employability skills (see Chapters 1). But in order to achieve all these outcomes the simulations would have to be designed based on specific research that addresses key areas such as the ontological

perspectives of all the desired positions, and tacit heuristic expert thinking. Additional research would also be needed into mental health issues and the application of *cognitive behavioural* techniques and strategies (CBT/CBI) and other methods with proven results in educational interventions (Mayer, 2009).

An open, honest, empathetic and pragmatic approach to the issue of mental health will face a whole separate set of challenges due to its current (but thankfully changing) cultural stigma and the ignorance surrounding it. But the types of challenges to integrating educational interventions for mental health are very similar to those described for integrating *life skills* into curriculum and some of the solutions could work for both. The design of integrated game mechanics (gameplay) with content and outcomes are critical components that will require active participation at an epistemic level (personal, socio-cultural, institutional), with gameplay that must involve participants in situations and problems that are as close as possible to an actual organization's complex holistic real world scenarios. Specifically designed simulations allow for facilitated experiences targeted at providing opportunities to practise responses that are aware and reflective of personal perspectives, tendencies, and behaviours as perceived by company and industry perspectives as well as the educational institution, the larger culture, and society. In this way multiple stakeholders can be represented and served.

I suggest a superior delivery method for the above described type of simulation curriculum would be an *epistemic game* (see Chapter 2) as per Shaffer and Gee (2005) using scenarios and situations within real world contexts where gap competencies are most obvious and needed. Key features of an epistemic game solution would include leveraging the cachet and opportunities available within new technologies such as electronic games and simulations, mobile computing, and the Internet; the potential to break free of legacy issues due to an

ideological heritage coming from outside of academia; and the necessity of aware explicit ontologies and experiences that are epistemologically interdisciplinary. In their words, epistemic games provide “educators an opportunity to move beyond disciplines derived from medieval scholarship constituted within schools developed in the industrial revolution—[on to] a new model of learning” (p. 25). In Schön’s words, on to a new epistemology of practice.

To provide a simplified example of the type of simulation/game/curriculum being envisioned I offer the following: Within the simulation, players must join a team within a company and progress through various scenario simulations with consequences such as being fired, promoted, moved to better projects or worse projects, being ostracized by peers or recognized and praised, and so on. Level 1 of the game could focus on dealing with the typical scenarios and gaps collected within the epistemic frameworks of the companies modelled. Industry structure would be modelled on the real world major and minor company types and include a sales feedback factor (probably random). Players who master gap competencies would be head hunted, gap neutral players possibly recruited or ignored, and extremely poor gap competency players would be fired and have to apply to work elsewhere. All players would be required by the game mechanics to work for a minimum number and variety of companies represented in the game (with actual companies represented according to their structures and issues) in order to progress. Certain positions within each game company would be held by mentors from industry, education, society, peers, as appropriate for the objective, outcome, and developmental level expectations.

The development of expert learner characteristics as a goal within an epistemic game simulation seems to have a high probability of meeting the requirements identified at the beginning of this chapter. The game simulation can structurally demand adaptive holistic

progress, disorienting dilemmas, and increasingly complex situations. It can be designed to be authentic to the work environment (a different game for each industry or even each company), with a diverse set of just-beyond-manageable situations. Furthermore time is adaptable and controllable, and a high percentage of situations can be modelled. The expert learner concept can be embedded and measured in game play as demonstrable competencies, experiential learning by doing can also be modelled, and industry mentors can be used to guide experiences and reflection on them.

Chapter 7 – Conclusion

This dissertation's research focus developed out of observations on the ongoing tension within and between the purposes of higher education and the outcomes that graduates evidence. In particular, the tension arising from perceived gaps in graduate preparedness for success in the work world. The vast majority of the research I found in the area of employability skills and gaps focused on the perception of senior corporate management or concentrated on descriptive generic technical or base-level essential skills. Since employability skills research has been ongoing for at least thirty years without any significant improvement in reported results, it is reasonable to seek a more comprehensive and nuanced understanding of the gaps and the context that their perceptions exist in. This research therefore sought to gain insight into the perceptions of short and long term success, expertise acquisition, novice gaps, and dysfunctions related to achieving success. A case study methodology was used to delve into workers' perceptions of expertise and graduate preparedness for successful short and long term integration into a game production environment (a cutting edge environment). It was hoped that an exploration of these concepts by production level workers might provide valuable insight into improving curriculum design and delivery or for defining additional avenues of research. Because the research is qualitative using a small case sample size, no definitive conclusions can be made, but a number of insights emerged that could point to valuable paths for curriculum design and further research.

The research results provided evidence to support the position that game developers' perceptions align with employability skills research and the gaps identified in that research. But because the game development environment is complex, employability skills as defined in the research literature may be too generic and low level to be effective for the development of curriculum that will decrease the expectation gaps game employers and production teams have

of graduates. A number of conclusions arose from the analysis and were reported throughout this dissertation. Following are the key conclusions that led to the suggested alternative content and outcomes foci embodied in the term expert learner, and the alternative design perspective and delivery methodology epitomized by *epistemic games* as explored in Chapter 6.

One key conclusion is that the critical values, desires, and needs of the production team, company management, and individual team members, are not aligned with what is typically presented as job requirements, for instance in job descriptions, nor with the outcomes of many college programs. The tendency of job descriptions and curriculum implementation is to focus on what is easy to quantify, namely the technical skills. So, even though *fit* was considered the top need by the team (technical skills are a given), the personal-social-cognitive behaviours that make up *fit* are seldom clear for the team itself and seldom presented to applicants or curriculum developers in useful terms (see Table 25 for a summary of stakeholder mismatches). A second key conclusion is that the behavioural and cognitive characteristics that lead to long term success and acquisition of expertise in the game development production field are closely aligned with the behavioural and cognitive characteristics that lead to employment readiness and academic success. As well, expert characteristics seem to align with *positive psychology* and *cognitive behavioural interventions* (CBI), and this becomes increasingly important for educators who must deal with trends in increasing mental health issues of students. One implication of the alignment is that expertise characteristics are also basic characteristics for functional thinking and behaviours in life and relationships in general and not just vocational or academic concerns. But a major issue for educators is that the expert characteristics being discussed have a developmental aspect to them that render them resistant to being taught as abstract academic subjects or discipline knowledge. Rather than relying solely on years of structured or non-

structured deliberate practice to evolve expertise in the workplace, accelerated development may require assessment of curriculum models such as transformative education, developmental constructivism, game based learning, epistemic games, and cognitive behavioural intervention methodologies.

The research analysis also highlighted two key characteristics that could be powerful contributors to graduates' employment readiness, to students' academic success, to lifelong expertise acquisition, and to general long-term success: Passion and holistic perspectives. The holistic perspective includes a meta-level awareness of self, others, and the situation and a reflective process parallel to Dewey's model of reflective thinking. A degree of self-awareness is a prerequisite for a holistic self-perspective, including one's own tendency towards heuristic thinking using tacit knowledge. Passion is the fuel that powers perseverance but in order for it to be a contributor to success it requires clarification and direction towards a self-defined success goal. These and other characteristics were exemplified in the description of one exceptional novice, and that description led to validating the term expert learner as someone who has acquired a base level set of key expert characteristics thus vastly improving their chances of becoming advanced, competent, proficient, or expert in an efficient manner. This validation offers additional characteristics and insights that could substantially improve the effectiveness of the concept for curriculum design. A proposal was made to use the term expert learner and the characteristics and competencies bundled into it as a focus for vocational curriculum outcomes based on the perspective that although expertise must be developed over time through deliberate practice, the characteristics and competencies that facilitate and accelerate its acquisition can be learned and taught (in addition to entry-level technical skills).

One of the values of the research in this dissertation comes from its attempt to compare an in-depth exploration of the perceptions of workers directly involved in production work from a cross section of the game industry, with the broader employability skills survey-style research or single company perspective, and with a number of theoretical perspectives concerning vocational expertise and education. This approach privileged a focus on the dynamic complex nature of issues and potential solutions that may not have otherwise or previously been considered, and that might provide evidence for the value of pursuing further research into some of these issues or possible solutions. The issues and potential solutions are timely considering a number of current situations that include the perceived relation between higher education and national progress, prosperity, and personal upward mobility in the face of global economic distress and the failure of the education system; the perceived failure of public education to meet the needs of society; the trend towards an increasing percentage and severity of mental health problems in education; and the global changes occurring in almost every area of human life, but especially in technology, economics, and education.

As is often said, strengths are usually also a weakness. In this research the values previously mentioned also carry negative consequences. Drawing attention to potential systemic issues and solutions that don't fit well within the system does not necessarily provide any direct or immediate assistance for creating change on a systemic level. But the needs are immediate and with potentially severe consequences weighing on stakeholders. But the North American education system generally lacks expertise in creating and delivering curriculum for transformation and development. Exacerbating the situation is a lack of stakeholder awareness and clarity regarding the issues and potential solutions, not the least of which are student expectations and perceptions that have been shaped by sociocultural forces barely imaginable

only a hundred years ago. Whether or not it is accurate to stereotype new generations there is clear evidence that young peoples' expectations and perspectives have changed, that narcissism is growing, and that the suggestion that students lack basic personal, social, and cognitive skills is very negatively received by students. This is one of the reasons that an epistemic game based education model is potentially far superior to traditional models for achieving the types of development required to close the employability expectation gap, and to facilitate the development of concepts such as the expert learner. The model is already integrated into and associated with positive experiences of students and, if done well, could incorporate desired competencies and transformational methodology inherently in the process.

References

- ACE. (1997). *Spanning the chasm: Corporate and academic cooperation to improve work-force preparation* (Task Force on High-Performance Work and Workers: The Academic Connection, Trans.). Washington, D.C.: ACE - American Council on Education.
- Aldrich, C. (2005). *Learning by doing: A comprehensive guide to simulations, computer games, and pedagogy in e-learning and other educational experiences*. San Francisco, CA: Pfeiffer.
- Aldrich, C. (2011). *Unschooling rules* (2nd ed.). Austin, TX: Greenleaf Book Group Press.
- Alexander, J. F. (2009). *Contracting through the lens of classical pragmatism: An exploration of local government contracting*. San Marcos, TX: Texas State University.
- Altbach, P. G., Berdahl, R. O., & Gumport, P. J. (2005). *American higher education in the twenty-first century: Social, political, and economic challenges* (2nd ed.). Baltimore, MD: Johns Hopkins University Press.
- America Competes Reauthorization Act of 2010. (2010). *H.R. 5116*. 111th Congress. Retrieved from www.gpo.gov/fdsys/pkg/BILLS-111hr5116enr/.../BILLS-111hr5116enr.pdf.
- Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *American Psychological Society, 12*(5), 353-359.
- Anderson, R. A., Crabtree, B. F., Steele, D. J., & McDaniel Jr., R. R. (2005). Case Study research: The view from complexity science. *Qualitative Health Research, 15*(5), 669-685.
- Anderssen, E. (2011, February 18). Gap year: Why your kid shouldn't go to school in the fall, *Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/life/family-and-relationships/gap-year-why-your-kid-shouldnt-go-to-school-in-the-fall/article1912696/>
- Argyris, C., & Schön, D. A. (1978). *Organizational learning*. Reading, MA: Addison-Wesley Pub. Co.
- ASTD. (2006). *Bridging the skills gap: How the skills shortage threatens growth and competitiveness...And what to do about it*. Alexandria, VA: ASTD - American Society for Training & Development.
- ASTD. (2009). *Bridging the skills gap: New factors compound the growing skills shortage*. Alexandria, VA: ASTD - American Society for Training & Development.

- Badley, G. (2003). The crisis in educational research: A pragmatic approach. *European Educational Research Journal*, 2(2), 296-308.
- Baldwin, M. L. (2007, December 4). Re: [game_edu] loopy proposal - the aggies! [electronic mailing list message] Retrieved October 4, from http://seven.pairlist.net/pipermail/game_edu/2007-December/000003.html
- Baron, R. A., & Henry, R. A. (2010). How entrepreneurs acquire the capacity to excel: Insights from research on expert performance. *Strategic Entrepreneurship Journal*, 4(1), 49-65. doi: 10.1002/sej.82
- Barr, R. B., & Tagg, J. (1995). From teaching to learning: A new paradigm for undergraduate education. *Change*, 27(6), 12-25.
- Barrow, R. (1987). Skill talk. *Journal of Philosophy of Education*, 21(2), 187-195. doi: 10.1111/j.1467-9752.1987.tb00158.x
- Baxter Magolda, M. B. (1999). *Creating contexts for learning and self-authorship: Constructive-developmental pedagogy*. Nashville, TN: Vanderbilt University Press.
- Baxter Magolda, M. B., & King, P. M. (2004). *Learning partnerships: Theory and models of practice to educate for self-authorship*. Sterling, VA: Stylus.
- Beach, D. P. (1982). A training program to improve work habits, attitudes, and values. *Journal of Epsilon Pi Tau*, 8(2), 69-74.
- Beasley-Murray, S. (1996). A Deweyan method of teaching genetics: To integrate science and ethics with student-centered problem solving. *Genetics in the 21st Century: Destiny, Chance or Choice*, V. Retrieved from <http://www.yale.edu/ynhti/curriculum/units/1996/5/96.05.03.x.html>
- Becker, K., & Parker, J. R. (2007). Serious games + computer science = serious CS. *Journal of Computing Science in Colleges*, 23(2), 40-46.
- Begel, A., & Simon, B. (2008a). *Novice software developers, all over again*. Paper presented at the fourth international workshop on Computing Education Research, Sydney, Australia.
- Begel, A., & Simon, B. (2008b). Struggles of new college graduates in their first software development job. *SIGCSE Bulletin*, 40(1), 226-230. doi: 10.1145/1352322.1352218
- Belenky, M. F. (1997). *Women's ways of knowing: The development of self, voice, and mind* (10th anniversary ed.). New York, NY: BasicBooks.

- Bennett, A., & Elman, C. (2006). Qualitative research: Recent developments in case Study methods. *Annual Review of Political Science*, 9(1), 455-476.
- Berliner, D. C., & Biddle, B. J. (1997). *The manufactured crisis : Myths, fraud, and the attack on America's public schools* (College ed.). White Plains, NY: Longman USA.
- Biesta, G., & Burbules, N. C. (2003). *Pragmatism and educational research*. Lanham, MD: Rowman & Littlefield.
- Billett, S. (2001). Knowing in practice: Re-conceptualising vocational expertise. *Learning and Instruction*, 11(6), 431-452.
- Bloom, A. D. (1987). *The closing of the American mind: How higher education has failed democracy and impoverished the souls of today's students*. New York, NY: Simon and Schuster.
- Bloom, P. (2010). *How pleasure works: The new science of why we like what we like*. New York, NY: W. W. Norton.
- Bogdan, R., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston, MA: Pearson A & B.
- Bok, D. C. (2003). *Universities in the marketplace: The commercialization of higher education*. Princeton, NJ: Princeton University Press.
- Bok, D. C. (2006). *Our underachieving colleges: A candid look at how much students learn and why they should be learning more*. Princeton, NJ: Princeton University Press.
- Boyatzis, R. E., Stubbs, E. C., & Taylor, S. N. (2002). Learning cognitive and emotional intelligence competencies through graduate management education. *Academy of Management Learning & Education*, 1(2), 150-162.
- Bransford, J., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press. National Research Council (U.S.) Committee on Developments in the Science of Learning.
- Bransford, J., & Stein, B. S. (1993). *The ideal problem solver: A guide for improving thinking, learning, and creativity* (2nd ed.). New York, NY: W.H. Freeman.
- British Columbia. (2006). *Degree program review criteria and guidelines*. Retrieved from <http://www.aved.gov.bc.ca/degree-authorization/documents/degree-program-criteria.pdf>.
- British Columbia. (2011). *Family roots: BC's changing families*. Retrieved from http://www.mcf.gov.bc.ca/about_us/pdf/CFD_FamilyRoots_booklet.pdf.

- Brookfield, S. (2005). *The power of critical theory: Liberating adult learning and teaching*. San Francisco, CA: Jossey-Bass.
- Bruer, J. T. (1993). The mind's journey from novice to expert: If we know the route, we can help students negotiate their way. *American Educator*, 17(2), 6-15, 38-46.
- Bruner, J. S. (1960). *The process of education*. Cambridge, MA: Harvard University Press.
- Bruner, J. S. (1985). Vygotsky: A historical and conceptual perspective. In J. V. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 21-34). Cambridge, England: Cambridge University Press.
- Bryce, D. (2001). Digital game-based learning. *Training & Development*, 55(6), 86-88.
- Buchanan, J. W. (2005). Vocational training for video game programmers? No thanks!: An open letter to computer science programs Retrieved December 5, 2005, from www.cscisnc.com/etek/BuchananEAOpenLetter.pdf
- Burson, K. A., Larrick, R. P., & Klayman, J. (2006). Skilled or unskilled, but still unaware of it: How perceptions of difficulty drive miscalibration in relative comparisons. *Journal of Personality and Social Psychology*, 90(1), 60-77. doi: 10.1037/0022-3514.90.1.60
- Business Council of British Columbia. (2004). 2004 biennial skills and attributes survey report: What are bc employers looking for? Vancouver, Canada.
- Byrnes, J. P. (2001). *Cognitive development and learning in instructional contexts* (2nd ed.). Boston, MA: Allyn and Bacon.
- Carlson, S. (2003). Video games in the classroom? *The Chronicle of Higher Education Colloquy Live*, 49(49), A31-33. Retrieved from <http://chronicle.com/colloquylive/2003/08/video/>
- Carnevale, A. P., Gainer, L. J., & Meltzer, A. S. (1990). *Workplace basics: The essential skills employers want*. San Francisco, CA: Jossey-Bass.
- CCL. (2006). The skills gap in Canada: The knowledge intensity of Canadians' jobs is growing rapidly *Lessons in Learning*. Ottawa, Canada: CCL - Canadian Council on Learning.
- CCL. (2007). Unlocking Canada's potential: The state of workplace and adult learning in Canada, report on learning in Canada 2007 *State of Learning in Canada*. Ottawa, Canada: CCL - Canadian Council on Learning.

- Chambers, J. R., & Windschitl, P. D. (2004). Biases in social comparative judgments: The role of nonmotivated factors in above-average and comparative-optimism effects. *Psychological Bulletin*, 130(5), 813-838. doi: 10.1037/0033-2909.130.5.813
- Chapman, A. (2003-2010). Conscious competence learning model -stages of learning matrix - unconscious incompetence to unconscious competence - and other theories and models for learning and change. Retrieved September 16, 2011, from <http://www.businessballs.com/consciouscompetencelearningmodel.htm>
- Chase, W. G., & Simon, H. A. (1973). Perception in chess. *Cognitive Psychology*, 4, 55-81.
- Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Cianciolo, A. T., Grigorenko, E. L., Jarvin, L., Gil, G., Drebot, M. E., & Sternberg, R. J. (2006). Practical intelligence and tacit knowledge: Advancements in the measurement of developing expertise. *Learning and Individual Differences*, 16(3), 235-253.
- CLPNBC. (2001). Standards of practice for licensed practical nurses in British Columbia (2001): Standards of practice and competencies. Vancouver, Canada: CLPNBC - College of Licensed Practical Nurses of British Columbia.
- Cohen, S. (2006). *Virtual decisions: Digital simulations for teaching reasoning in the social sciences and humanities*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Collins, A., Brown, J. S., & Holum, A. (1991). Cognitive apprenticeship: Making thinking visible. *American Educator*, 6(11), 38-46.
- Collins, H. M., & Evans, R. (2007). *Rethinking expertise*. Chicago, IL: University of Chicago Press.
- Collins, J. C. (2001). *Good to great: Why some companies make the leap--and others don't*. New York, NY: HarperBusiness.
- Conference Board of Canada. (2000). *Employability skills 2000 +*. Ottawa, ON: Conference Board of Canada.
- Conference Board of Canada. (2003a). *Innovation skills profile*. Ottawa, ON: Conference Board of Canada.
- Conference Board of Canada. (2003b). *Out of the classroom, into the workforce: Mining youth potential*. Ottawa, ON: Conference Board of Canada.

- Conference Board of Canada. (2006). Are they really ready to work? Ottawa, ON: Conference Board of Canada.
- Côté, J. E., & Allahar, A. (2007). *Ivory tower blues: A university system in crisis*. Toronto, Canada: University of Toronto Press.
- Cotton, K. (2001). Developing employability skills. *School Improvement Research Series* Retrieved November 29, 2007, from <http://www.nwrel.org/scpd/sirs/8/c015.html>
- Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.
- Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.
- Cultural Human Resources Council. (2011) Retrieved September 18, 2010, from <http://www.culturalhrc.ca/research/default-e.asp>
- Daley, B. J. (1999). Novice to expert: An exploration of how professionals learn. *Adult Education Quarterly*, 49(4), 133-147.
- Davis, A. B. (2004). *Inventions of teaching: A genealogy*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Davis, A. B., & Sumara, D. J. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Davis, A. B., Sumara, D. J., & Kieren, T. E. (1996). Cognition, co-emergence, curriculum. *Journal of Curriculum Studies*, 28(2), 151-169. doi: 10.1080/0022027980280203
- Davis, A. B., Sumara, D. J., & Luce-Kapler, R. (2000). *Engaging minds: Learning and teaching in a complex world*. Mahwah, NJ: Lawrence Erlbaum Associates.
- De Jaegher, H., & Di Paolo, E. (2007). Participatory sense-making: An enactive approach to social cognition. *Phenomenology and the Cognitive Sciences*, 6(4), 485-507.
- Della Rocca, J. (2006). *In the trenches: Game developers and the quest for innovation*. Paper presented at the Proceedings of the 2006 ACM SIGGRAPH symposium on Videogames, Boston, MA.

- Demick, J. (1994). Editor's note: The parameters of adult development. *Journal of Adult Development, 1*(1), 1-5.
- Dempsey, J. V., Haynes, L. L., Lucassen, B. A., & Casey, M. S. (2002). Forty simple computer games and what they could mean to educators. *Simulation & Gaming, 33*(2), 157-168.
- Dewey, J. (1991). *How we think*. Buffalo, NY: Prometheus Books.
- Dewey, J. (1997). *Democracy and education: An introduction to the philosophy of education*. New York, NY: Free Press.
- Dewey, J. (1998). *Experience and education* (60th anniversary ed.). West Lafayette, IN: Kappa Delta Pi.
- Doncaster, K., & Lester, S. (2002). Capability and its development: Experiences from a work-based doctorate. *Studies in Higher Education, 27*(1), 91-101. doi: 10.1080/03075070120099395
- Drago-Severson, E., Helsing, D., Kegan, R., Broderick, M., Popp, N., & Portnow, K. (2001). Three developmentally different types of learners. *Focus on Basics: Connecting Research and Practice, 5*(B), 7-9. Retrieved from <http://www.ncsall.net/?id=268>
- Dreyfus, H., & Dreyfus, S. E. (1999). The challenge of Merleau-Ponty's phenomenology of embodiment for cognitive science. In G. Weiss & H. F. Haber (Eds.), *Perspectives on embodiment* (pp. 103-120). NY: Routledge.
- Dreyfus, H., & Dreyfus, S. E. (2004). The ethical implications of the five-stage skill acquisition model. *Bulletin of Science, Technology and Society, 24*(3), 251-264.
- Dreyfus, H., Dreyfus, S. E., & Athanasiou, T. (1986). *Mind over machine: The power of human intuition and expertise in the era of the computer*. New York: Free Press.
- Edmondson, H. T. (2006). *John Dewey and the decline of American education: How the patron saint of schools has corrupted teaching and learning*. Wilmington, DE: ISI Books.
- Egan, K. (1966). Competing voices for the curriculum. In M. Wideen & M. C. Courtland (Eds.), *The struggle for curriculum: Education, the state, and the corporate sector* (pp. 7-26). Burnaby, Canada: Institute for Studies in Teacher Education, Simon Fraser University.
- Egan, K. (2001). Why education is so difficult and contentious. *Teachers College Record, 103*(6), 923-941.
- Egan, K. (2002). *Getting it wrong from the beginning: Our progressivist inheritance from Herbert Spencer, John Dewey, and Jean Piaget*. New Haven, CT: Yale University Press.

- Eisner, E. W. (1991). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice*. New York, NY: Macmillan.
- Emery, F. E., & Trist, E. L. (1965). The causal texture of organizational environments. *Human Relations*, 18(1), 21-32. doi: 10.1177/001872676501800103
- Ericsson, K. A. (2000a). Expert performance and deliberate practice: An updated excerpt from Ericsson (2000). Retrieved from <http://www.psy.fsu.edu/faculty/ericsson/ericsson.exp.perf.html>
- Ericsson, K. A. (2000b). How experts attain and maintain superior performance: Implications for the enhancement of skilled performance in older individuals. *Journal of Aging and Physical Activity*, 8(4), 346-352. Retrieved from <http://www.humankinetics.com/JAPA/viewarticle.cfm?jid=z2BcY42gz2JxC2z8z4Csn683z3Rvs63wz6EznMm8z7PjaK&view=art&aid=1536&site=z2BcY42gz2JxC2z8z4Csn683z3Rvs63wz6EznMm8z7PjaK>
- Ericsson, K. A. (2005). Recent advances in expertise research: A commentary on the contributions to the special issue. *Applied Cognitive Psychology*, 19(2), 233-241.
- Ericsson, K. A. (2007). An expert-performance perspective of research on medical expertise: The study of clinical performance. *Medical Education*, 41(12), 1124-1130.
- Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: Evidence of maximal adaptation to task constraints. *Annual Review of Psychology*, 47, 273-305.
- Ericsson, K. A., Nandagopal, K., & Roring, R. W. (2005). Giftedness viewed from the expert-performance perspective. *Journal for the Education of the Gifted*, 28(3-4), 287.
- Ericsson, K. A., Prietula, M. J., & Cokely, E. T. (2007a). The making of an expert. *Harvard Business Review*, 85, 147.
- Ericsson, K. A., Roring, R. W., & Nandagopal, K. (2007b). Giftedness and evidence for reproducibly superior performance: An account based on the expert performance framework. *High Ability Studies*, 18(1), 3.
- Erikson, E. H. (1980). *Identity and the life cycle*. New York, NY: Norton.
- Ertmer, P. A., & Newby, T. J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science*, 24(1), 1-24. doi: 10.1007/bf00156001
- Evers, F. T., Rush, J. C., & Berdrow, I. (1998). *The bases of competence: Skills for lifelong learning and employability*. San Francisco, CA: Jossey-Bass.

- Facione, P. A. (2011). *Think critically*. Upper Saddle River, NJ: Prentice Hall.
- Farrington-Darby, T., & Wilson, J. R. (2006). The nature of expertise: A review. *Applied Ergonomics*, 37(1), 17-32.
- Fenwick, T. J. (2000). Expanding conceptions of experiential learning: A review of the five contemporary perspectives on cognition. *Adult Education Quarterly*, 50(4), 243.
- Ficocelli, L. (2007). Industry – academia: How can we collaborate? Proceedings of the Canadian Games Study Association 2006 symposium. *Loading... 1*(1). Retrieved from <http://journals.sfu.ca/loading/index.php/loading/article/view/10>
- Finnie, R., Mueller, R. E., Sweetman, A., & Usher, A. (2008). Who goes? Who stays? What matters? Accessing and persisting in post-secondary education in Canada. *Queen's Policy Studies Series #63*. Montreal and Kingston, Canada: Queen's University.
- Finnie, R., Sweetman, A., Mueller, R. E., & Usher, A. (2010). *New perspectives on access to postsecondary education*. Ottawa, Canada: Retrieved from <http://www.statcan.gc.ca/pub/81-004-x/2010001/article/11152-eng.htm>.
- Gallagher, R. P. (2010). National survey of counseling center directors 2010 *Monograph Series* (Vol. 8S). Alexandria, VA: ACCA - American College Counseling Association.
- Garrison, J. (1999). John Dewey. In M. Peters, P. Ghiraldelli, B. Zarnic & A. Gibbons (Eds.), *Encyclopaedia of Philosophy of Education*. Split, HR: University of Split: Faculty of Philosophy. Retrieved from http://www.ffst.hr/ENCYCLOPAEDIA/doku.php?id=dewey_john.
- Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.
- Geiger, R. L. (2004). *Knowledge and money: Research universities and the paradox of the marketplace*. Stanford, CA: Stanford University Press.
- Gelman, S. A. (2003). *The essential child: Origins of essentialism in everyday thought*. Oxford, England: Oxford University Press.
- Giacobbi, P. R., Poczwardowski, A., & Hager, P. (2005). A pragmatic research philosophy for sport and exercise psychology. *The Sport Psychologist*, 19, 18-31.
- Gibb, J. (Ed.). (2004). *Generic skills in vocational education and training. Summary of Australian Chamber of Commerce and Industry/Business Council of Australia's*

- employability skills*. Adelaide, Australia: National Centre for Vocational Education Research.
- Gibson, D., Aldrich, C., & Prensky, M. (2007). *Games and simulations in online learning: Research and development frameworks*. Hershey, PA: Information Science.
- Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology*, 75(3), 617-638.
- Gilbert, R., Balatti, J., Turner, P., & Whitehouse, H. (2004). The generic skills debate in research higher degrees. *Higher Education Research & Development*, 23(3), 375-388. doi: 10.1080/0729436042000235454
- Giroux, H. A. (2007). *The university in chains: Confronting the military-industrial-academic complex*. Boulder, CO: Paradigm Publishers.
- Godin, S. (2010). *Linchpin: Are you indispensable?* New York, NY: Portfolio.
- Goodlad, J. I. (1994). *What schools are for* (2nd ed.). Bloomington, IN: Phi Delta Kappa Educational Foundation.
- Goodlad, J. I. (2009). Yesterday and today: Telling the story of renewing education in a democracy. *Education in a Democracy: A Journal of the NNER*, 1(Fall 2009). Retrieved from <http://www.units.muohio.edu/nnerjournal/pdf%20files/2009%20NNER%20Journal%20PDF/Art-1%20Yesterday%20and%20Today%20Goodlad%2010-09.pdf>
- Goodlad, J. I., & Goldberg, M. F. (2000). An interview with John Goodlad: Leadership for change. *The Phi Delta Kappan*, 82(1), 82-85.
- Goodlad, J. I., Sirotnik, K. A., & Overman, B. C. (1979). An overview of 'a Study of schooling'. *The Phi Delta Kappan*, 61(3), 174-178.
- Graff, G. (2003). *Clueless in academe: How schooling obscures the life of the mind*. New Haven, CT: Yale University Press.
- Greenberg, M. T., Weissberg, R. P., O'Brien, M. U., Zins, J. E., Fredericks, L., Resnik, H., & Elias, M. J. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist*, 58(6), 466-474. doi: 10.1037/0003-066x.58.6-7.466

- Grigorenko, E. L., Meier, E., Lipka, J., Mohatt, G., Yanez, E., & Sternberg, R. J. (2004). Academic and practical intelligence: A case study of the Yup'ik in Alaska. *Learning and Individual Differences, 14*(4), 183-207.
- Hallowell, E. M., & Ratey, J. J. (2006). *Delivered from distraction: Getting the most out of life with attention deficit disorder* (Trade paperback ed.). New York, NY: Ballantine Books.
- Harris, J. (2001). The effects of computer games on young children - a review of the research. London: Research, Development and Statistics Directorate, Communications Development Unit, Home Office.
- Hase, S., & Davis, L. (1999, August). *From competence to capability: The implications for human resource development and management*. Paper presented at the Association of International Management, 17th Annual Conference, San Diego.
- Hase, S., & Kenyon, C. (2007). Heutagogy: A child of complexity theory. *Complicity: An International Journal of Complexity and Education, 4*(1), 111-118.
- Hatano, G. (1982). Cognitive consequences of practice in culture specific procedural skills. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition, 4*, 15-18.
- Hawke, G. (Ed.). (2004). *'Generic skills' in a changing work environment*. Adelaide, Australia: National Centre for Vocational Education Research Ltd.
- Heifetz, R. A. (1994). *Leadership without easy answers*. Cambridge, MA: Belknap Press of Harvard University Press.
- Hersh, R. H., & Merrow, J. (2005). *Declining by degrees: Higher education at risk*. New York: Palgrave Macmillan.
- Hewner, M., & Guzdial, M. (2010). *What game developers look for in a new graduate: Interviews and surveys at one game company*. Paper presented at the 41st ACM Technical Symposium on Computer Science Education, Milwaukee, Wisconsin, USA.
- Hirsch, E. D. (2006). *The knowledge deficit: Closing the shocking education gap for American children*. Boston, MA: Houghton Mifflin.
- Hoare, C. H. (2006a). Growing a discipline at the borders of thought. In C. H. Hoare (Ed.), *Handbook of adult development and learning* (pp. 3-26). Oxford, England: Oxford University Press.
- Hoare, C. H. (2006b). *Handbook of adult development and learning*. Oxford, England: Oxford University Press.

- Hoffman, T. (2007). 10 career-killers to avoid. *ComputerWorld*, (November). Retrieved from <http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9045786>
- Hollins, P. (2003). Playing is the new learning. *E.Learning Age*, December-January, 16-19.
- Hoyer, W. J., & Rybash, J. M. (1994). Characterizing adult cognitive development. *Journal of Adult Development*, 1(1), 7-12.
- Human Resources and Skills Development Canada. (2011). Literacy and essential skills Retrieved November 18, 2010, from <http://www.hrsdc.gc.ca/eng/workplaceskills/LES/index.shtml>
- Hyland, T., & Johnson, S. (1998). Of cabbages and key skills: Exploding the mythology of core transferable skills in post-school education. *Journal of Further and Higher Education*, 22(2), 163-172. doi: 10.1080/0309877980220205
- Hyslop-Margison, E. J. (2000). The employability skills discourse: A conceptual analysis of the career and personal planning curriculum. *Journal of Educational Thought*, 34(1), 59-72.
- Hyslop-Margison, E. J., & Welsh, B. H. (2003). Career education and labour market conditions: The skills gap myth. *Journal of Educational Thought*, 37(1), 5-21.
- Illeris, K. (2004). *The three dimensions of learning* (Reprint English ed.). Malabar, FI: Krieger.
- Jacobson, M. J., & Spiro, R. J. (1995). Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: An empirical investigation. *Journal of Educational Computing Research*, 12(4), 301-333.
- Jarvis, P. (2006). *Towards a comprehensive theory of human learning*. London, England: Routledge.
- John, O. P., Robins, R. W., & Pervin, L. A. (2008). *Handbook of personality: Theory and research* (3rd ed.). New York, NY: Guilford Press.
- Johnson, S. (2005). *Everything bad is good for you: How today's popular culture is actually making us smarter*. New York, NY: Riverhead Books.
- Kearns, P. (2004). VET in the 21st century global knowledge economy. Brisbane, Australia: Australian National Training Authority.
- Kegan, R. (1982). *The evolving self: Problem and process in human development*. Cambridge, MA: Harvard University Press.

- Kegan, R. (1994). *In over our heads: The mental demands of modern life*. Cambridge, MA: Harvard University Press.
- Kegan, R., & Lahey, L. L. (2001). *How the way we talk can change the way we work: Seven languages for transformation*. New York, NY: Jossey-Bass.
- Kegan, R., & Lahey, L. L. (2009). *Immunity to change: How to overcome it and unlock potential in yourself and your organization*. Boston, Mass.: Harvard Business Press.
- Kevin, H. (2002). A grounded theory for teaching entrepreneurship using simulation games. *Simulation and Gaming*, 33(2), 236-241. doi: <http://dx.doi.org/10.1177/1046878102332012>
- Kitchener, K. S., King, P. M., & DeLuca, S. (2006). Development of reflective judgment in adulthood. In C. H. Hoare (Ed.), *Handbook of adult development and learning* (pp. 73-98). Oxford, England: Oxford University Press.
- Kohlberg, L. (1981). *The meaning and measurement of moral development*. Worcester, MA: Clark University Press.
- Kohlberg, L. (1984). *The psychology of moral development: The nature and validity of moral stages*. San Francisco, CA: Harper & Row.
- Kohlberg, L. (2011). The cognitive-developmental approach to moral education. In A. C. Ornstein, E. Pajak & S. B. Ornstein (Eds.), *Contemporary issues in curriculum* (5th ed., pp. 150-163). Boston, MA: Pearson.
- Kohn, A. (2011). A critical examination of character education. In A. C. Ornstein, E. Pajak & S. B. Ornstein (Eds.), *Contemporary issues in curriculum* (5th ed., pp. 164-181). Boston: Pearson.
- Konrath, S. (Producer). (2010). Empathy: College students don't have as much as they used to. [podcast] Retrieved from <http://ns.umich.edu/htdocs/releases/story.php?id=7724>
- Kronman, A. T. (2007a). *Education's end: Why our colleges and universities have given up on the meaning of life*. New Haven, CT: Yale University Press.
- Kronman, A. T. (2007b). *What is living for?: The forgotten question in higher education*. New Haven, CT: Yale University Press.
- Kruger, J. (1999). Lake wobegon be gone! The "below-average effect" and the egocentric nature of comparative ability judgments. *Journal of Personality and Social Psychology*, 77(2), 221-232. doi: 10.1037/0022-3514.77.2.221

- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121-1134. doi: 10.1037/0022-3514.77.6.1121
- Kuhn, D. (2005). *Education for thinking*. Cambridge, MA: Harvard University Press.
- Kuhn, D., & Dean, D., Jr. (2004). Metacognition: A bridge between cognitive psychology and educational practice. *Theory Into Practice*, 43(4), 268-273.
- Kwok, M. (2004). Disciplinary differences in the development of employability skills of recent university graduates in Manitoba: Some initial findings. *Higher Education Perspectives*, 1(1), 60-77. Retrieved from <http://hep.oise.utoronto.ca/index.php/hep/article/view/588>
- Kwok, M. (2005). *Disciplinary differences in the perceptions of university graduates and faculty members with respect to the development of general employability skills in undergraduate programs*. (Doctoral dissertation, University of Manitoba, Canada). Retrieved from <http://proquest.umi.com/pqdweb?did=845779271&Fmt=7&clientId=6993&RQT=309&VName=PQD>
- Landa, L. N. (1976). *Instructional regulation and control: Cybernetics, algorithmatization and heuristics in education*. Englewood Cliffs, NJ: Educational Technology Publications.
- Landa, L. N. (1999). Landamatics instructional design theory and methodology for teaching general methods of thinking. In C. M. Reigeluth (Ed.), *Instructional-design theories and models: A new paradigm of instructional theory* (pp. 341-368). Mahwah, NJ: Lawrence Erlbaum Associates.
- Laske, O. E. (2006). Why does your maturity matter? How developmental theory impacts your coaching competence. *Choice Magazine*, 4, 10-13.
- Lavalley, P., & Wilson, L. (2006). *Adult basic education level three: (Adult 10) life/work studies curriculum guide*. Saskatchewan, Canada: Government of Saskatchewan Retrieved from <http://www.aee.gov.sk.ca/evergreen/lifeworkstudies/acknowledgements/>.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, England: Cambridge University Press.
- Lee, D. M. S., Trauth, E. M., & Farwell, D. (1995). Critical skills and knowledge requirements of IS Professionals: A joint academic/industry investigation. *MIS Quarterly*, 19(3), 313-340.
- Loevinger, J., & Blasi, A. (1976). *Ego development: Conceptions and theories*. San Francisco, CA: Jossey-Bass.

- Logan, D., King, J. P., & Fischer-Wright, H. (2008). *Tribal leadership: Leveraging natural groups to build a thriving organization*. New York, NY: Collins.
- Luck, L., Jackson, D., & Usher, K. (2006). Case study: A bridge across the paradigms. *Nursing Inquiry*, 13(2), 103-109.
- Makgato, M., & Mbanguta, Z. (2002). Towards an outcomes-based teaching and learning module for teacher preparation: Programmes of FET institutions' engineering and technology educators in South Africa. *World Transactions on Engineering and Technology Education*, 1(2), 6.
- Marquardt, M., Moss, J. C., Watts, G., Whittam, K., & Chudnovsky, D. (2003). Charter for public education. Vancouver, Canada: BCTF - British Columbia Teachers' Federation.
- Marsan, C. D. (2007). Tech skills to develop in 2008: Business acumen, rather than deeper technical expertise will be in demand in the years to come. *itbusiness.ca*, (December 22). Retrieved from <http://www.itbusiness.ca/it/client/en/home/News.asp?id=46473>
- Martin, J. R. (1996). There's too much to teach: Cultural wealth in an age of scarcity. *Educational Researcher*, 25(2), 4-16.
- Maslow, A. H. (1987). *Motivation and personality* (3rd ed. Rev. ed.). New York, NY: Harper & Row.
- Maturana, H. R., & Varela, F. J. (1992). *The tree of knowledge: The biological roots of human understanding* (Rev. ed.). Boston, MA: Shambhala.
- Maxfield, D., Grenny, J., McMillan, R., Patterson, K., & Switzler, A. (2005). *Silence kills: The seven crucial conversations for healthcare*. Provo, UT.
- Mayer, M. J. (2009). *Cognitive-behavioral interventions for emotional and behavioral disorders: School-based practice*. New York, NY: Guilford Press.
- McAuliffe, G. J. (2006). The evolution of professional competence. In C. H. Hoare (Ed.), *Handbook of adult development and learning* (pp. 476-496). Oxford, England: Oxford University Press.
- McAuliffe, G. J., & Eriksen, K. P. (1999). Toward a constructivist and developmental identity for the counseling profession: The context-phase-stage-style model. *Journal of Counseling & Development*, 77(3), 267-280.

- McGill, M. M. (2008). *Critical skills for game developers: An analysis of skills sought by industry*. Paper presented at the 2008 Conference on Future Play: Research, Play, Share, Toronto, Canada.
- McGill, M. M. (2009a). *Defining the expectation gap: A comparison of industry needs and existing game development curriculum*. Paper presented at the Fourth International Conference on Foundations of Digital Games, Orlando, Florida.
- McGill, M. M. (2009b). *Weighted game developer qualifications for consideration in curriculum development*. Paper presented at the Fourtieth ACM Technical Symposium on Computer Science Education, Chattanooga, TN.
- McGill, M. M. (2010a). *Collaborative design of cross-disciplinary game minors based on the IGDA curriculum framework*. Paper presented at the Fifteenth annual conference on Innovation and Technology in Computer Science Education, Bilkent, Ankara, Turkey.
- McGill, M. M. (2010b). *Undergraduate game degree programs in the United Kingdom and United States: A comparison of the curriculum planning process*. (Doctoral dissertation, Illinois State University), Normal, Illinois. Retrieved from <http://proquest.umi.com>
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. New York, NY: Penguin Press.
- Mead, G. H., & Morris, C. W. (1934). *Mind, self & society from the standpoint of a social behaviorist*. Chicago, IL: University of Chicago Press.
- Medin, D. L., & Atran, S. (2004). The native mind: Biological categorization and reasoning in development and across cultures. *Psychological Review*, *111*(4), 960-983. doi: 10.1037/0033-295x.111.4.960
- Menary, R. (2006). *Radical enactivism: Intentionality, phenomenology, and narrative: Focus on the philosophy of Daniel D. Hutto*. Amsterdam, The Netherlands: J. Benjamins.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Merriam, S. B., Caffarella, R. S., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.
- Mezirow, J. (1990). *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. San Francisco, CA: Jossey-Bass.
- Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco, CA: Jossey-Bass.

- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
- Miller, J. P. (1988). *The holistic curriculum*. Toronto, Canada: OISE Press, Ontario Institute for Studies in Education.
- Miller, J. P. (2005). *Holistic learning and spirituality in education: Breaking new ground*. Albany, NY: State University of New York Press.
- Morgan, D. L. (2007). Paradigms lost and pragmatism regained. *Journal of Mixed Methods Research*, 1(1), 48-76. doi: 10.1177/2345678906292462
- Morrison, B. B., & Preston, J. A. (2009). Engagement: Gaming throughout the curriculum. *SIGCSE Bulletin*, 41(1), 342-346. doi: <http://doi.acm.org/10.1145/1539024.1508990>
- Mungai, D., Jones, D., & Wong, L. (2002). *Games to teach by*. Paper presented at the Eighteenth Annual Conference on Distance Teaching and Learning, Madison, Wisconsin. <http://ets.tlt.psu.edu/learningdesign/node/12>
- Nathan, R. (2005). *My freshman year: What a professor learned by becoming a student*. Ithaca, NY: Cornell University Press.
- National Academies Press. (2007). *Rising above the gathering storm: Energizing and employing America for a brighter economic future*. Washington, DC.
- National Life/Work Centre. (2011). Blueprint for life/work designs. Retrieved September 11, 2011, from <http://www.blueprint4life.ca/>
- NCVER. (2011, September 21). NCVER - National Centre for Vocational Education Research Ltd. Retrieved September 21, 2011, from <http://www.ncver.edu.au/>
- Nielsen, K. (2010). Apprenticeship approach to learning. In P. Penelope, B. Eva & M. Barry (Eds.), *International encyclopedia of education* (pp. 469-475). Oxford, England: Elsevier.
- O'Brien, E., Hsing, C., & Konrath, S. H. (2010). *Changes in dispositional empathy in American college students over time: A meta-analysis*. Paper presented at the Revolutionary Science, Twenty-Second Annual Convention, Boston, MA. Retrieved from http://www.psychologicalscience.org/convention/program_2010/search/viewProgram.cfm?Abstract_ID=17975&AbType=&AbAuthor=&Subject_ID=&Day_ID=all&keyword=empathy

- O'Sullivan, E., Morrell, A., & O'Connor, M. A. (2002). *Expanding the boundaries of transformative learning: Essays on theory and praxis*. New York, NY: Palgrave.
- Okan, Z. (2003). Edutainment: Is learning at risk? *British Journal of Educational Technology*, 34(3), 255-264.
- Overtoom, C. (2000). Employability skills: An update. (ERIC Digest No. 220) Retrieved from <http://www.eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=ED445236>
- Pansiri, J. (2005). Pragmatism: A methodological approach to researching strategic alliances in tourism. *Tourism and Hospitality Planning & Development*, 2(3), 191-206.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: Volume 2, a third decade of research*. San Francisco, CA: Jossey-Bass.
- Patterson, K. (2002). Crucial conversations: Tools for talking when stakes are high. Retrieved from <http://www.lib.sfu.ca/cgi-bin/validate/books24x7.cgi?isbn=0071401946>
- Patterson, K. (2005). Crucial confrontations: Tools for resolving broken promises, violated expectations, and bad behavior. Retrieved from <http://proxy.lib.sfu.ca/login?url=http://site.ebrary.com/lib/sfu/Doc?id=10083649>
- Pausch, R. (2004). An academic's field guide to electronic arts: Observations based on a residency in the spring semester of 2004. Retrieved Nov 29, 2007, from <http://etc.cmu.edu/documents/fieldguide.pdf>
- Perkins, D. N. (1995). *Outsmarting IQ: The emerging science of learnable intelligence*. New York, NY: Free Press.
- Perry, W. G. (1999). *Forms of intellectual and ethical development in the college years: A scheme*. San Francisco, CA: Jossey-Bass.
- Pope, A. T., & Bogart, E. H. (1996). Extended attention span training system: Video game neurotherapy for attention deficit disorder. *Child Study Journal*, 26(1), 39-50.
- Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. *American Journal of Education*, 100(3), 354-395.
- Prensky, M. (2006). *"Don't bother me mom, I'm learning!": How computer and video games are preparing your kids for twenty-first century success and how you can help!* St. Paul, MN: Paragon House.

- Pulsipher, L. (2009). Student illusions about being a game designer. *Game Career Guide*. Retrieved from http://www.gamecareerguide.com/features/701/student_illusions_about_being_a_.php
- Pulsipher, L. (2010). The elephant in the room. *IGDA Perspectives Newsletter*. Retrieved from <http://www.igda.org/newsletter/?p=173>
- Quart, A. (2001). Child's play—do video games engender violence or enrich life? A scholarly battle to the death. *Lingua Franca*, 11(7), 50-57.
- Quinn, C. N. (2005). *Engaging learning: Designing e-learning simulation games*. San Francisco, CA: Pfeiffer.
- Rabe, C. B. (2006). *The innovation killer: How what we know limits what we can imagine—and what smart companies are doing about it*. New York, NY: American Management Association.
- Rahman, S., Mahmud, Z., Yassin, S., Amir, R., & Ilias, K. (2010). The development of expert learners in the classroom. *Contemporary Issues in Education Research*, 3(6), 1.
- Ramsey, A., & Watson, P. J. (1996). Self-reported narcissism and perceived parental permissiveness and authoritarianism. *Journal of Genetic Psychology*, 157(2), 227.
- Regehr, G., & Norman, G. R. (1996). Issues in cognitive psychology: Implications for professional education. *Academic Medicine*, 71(9), 988-1001.
- Reigeluth, C. M. (1999a). The elaboration theory: Guidance for scope and sequence decisions. In C. M. Reigeluth (Ed.), *Instructional-design theories and models: A new paradigm of instructional theory* (Vol. II). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Reigeluth, C. M. (1999b). *Instructional-design theories and models: Vol. 2. A new paradigm of instructional theory*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Reingold, E. M., Charness, N., Pomplun, M., & Stampe, D. M. (2001). Visual span in expert chess players: Evidence from eye movements. *Psychological Science*, 12, 48-55.
- Reisberg, D. (2001). *Cognition: Exploring the science of the mind* (2nd ed.). New York, NY: Norton.
- Reynolds, R. I. (1982). Search heuristics of chess players of different calibers. *The American Journal of Psychology*, 95(3), 383-392.
- Rhode, D. L. (2006). *In pursuit of knowledge: Scholars, status, and academic culture*. Stanford, CA: Stanford Law and Politics.

- Richards, L., & Morse, J. M. (2007). *Readme first for a user's guide to qualitative methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Ritchie, J., & Lewis, J. (2003). *Qualitative research practice: A guide for social science students and researchers*. London, England: Sage.
- Rogers, A. (2001). The theory and practice of transformative learning: A critical review. *International Journal of Educational Development*, 21(2), 180-182.
- Rogers, G., Mentkowski, M., & Hart, J. R. (2006). Adult holistic development and multidimensional performance. In C. H. Hoare (Ed.), *Handbook of adult development and learning* (pp. 497-535). Oxford, England: Oxford University Press.
- Rosenberg, M. B. (1999a). Nonviolent communication for educators [sound recording]. La Crescenta, CA: Center for Nonviolent Communication.
- Rosenberg, M. B. (1999b). *Nonviolent communication: A language of compassion*. Del Mar, CA: PuddleDancer Press.
- Rosovsky, H. (1990). *The university: An owner's manual*. New York, NY: W.W. Norton.
- Rothstein, R. (1998). *The way we were?: The myths and realities of America's student achievement*. New York, NY: Century Foundation Press.
- Rychen, D. S., & Salganik, L. H. (2001). DeSeCo: The definition and selection of key competencies. Paris, FR: OECD - Organisation for Economic Co-operation and Development.
- Salganik, L. H., & Rychen, D. S. (2003). *Key competencies for a successful life and a well-functioning society*. Cambridge, MA: Hogrefe & Huber.
- Saunders, D., & Smalley, N. (2000). Simulations and games for transition and change in lifelong learning. In D. Saunders & N. Smalley (Eds.), *The international simulation and gaming research yearbook* (pp. 1-9). London, England: Kogan.
- SCANS. (1991). What work requires of schools A SCANS Report for America 2000. Washington, DC: SCANS - Secretary's Commission on Achieving Necessary Skills.
- Schaie, K. W. (2005). *Developmental influences on adult intelligence: The Seattle longitudinal study* (Rev. ed. ed.). New York, NY: Oxford University Press.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books.

- Schön, D. A. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.
- Schön, D. A. (1995). Knowing-in-action: The new scholarship requires a new epistemology. *Change*, 27(6), 26-34.
- Schrag, P. (1997). The near-myth of our failing schools. *Atlantic Monthly*, 280(4), 72-80.
- Seligman, M. (2009). *Teaching resilience, sense of purpose in schools can prevent depression, anxiety and improve grades, according to research: Children with positive outlooks are better learners*. Paper presented at the American Psychological Association, Toronto, Canada. Retrieved from <http://www.apa.org/news/press/releases/2009/08/positive-educate.aspx>
- Shaffer, D. W. (2005). Epistemic games. *Innovate*, 1(6). Retrieved from http://epistemicgames.org/cv/papers/Epistemic_Games_Innovate.pdf
- Shaffer, D. W. (2007). *How computer games help children learn*. New York, NY: Palgrave Macmillan.
- Shaffer, D. W., & Gee, J. P. (2005). Before every child is left behind: How epistemic games can solve the coming crisis in education. (2005-7), 27. Retrieved from http://www.wcer.wisc.edu/publications/workingpapers/Working_Paper_No_2005_7.pdf
- Shaffer, D. W., Squire, K. R., & Gee, J. P. (2005). Video games and the future of learning. *The Phi Delta Kappan*, 87(2), 105-111.
- Shane, H., & Goodlad, J. (1978). Harold Shane interviews John Goodlad: A preview of 'schooling in America'. *The Phi Delta Kappan*, 60(1), 47-50.
- Shanteau, J., & Stewart, T. R. (1992). Why study expert decision making? Some historical perspectives and comments. *Organizational Behavior and Human Decision Processes*, 53(2), 95-106. doi: 10.1016/0749-5978(92)90057-e
- Shapiro, H. T. (2005). *A larger sense of purpose: Higher education and society*. Princeton, NJ: Princeton University Press.
- Shor, I. (1996). *When students have power: Negotiating authority in a critical pedagogy*. Chicago, IL: University of Chicago Press.
- Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy: Markets, state, and higher education*. Baltimore, MD: Johns Hopkins University Press.

- Small, G. W., & Vorgan, G. (2008). *iBrain: Surviving the technological alteration of the modern mind*. New York, NY: HarperCollins.
- Smuts, J. C. (1926). *Holism and evolution*. London, England: Macmillan.
- Snowman, J., McCown, R. R., & Biehler, R. F. (2009). *Psychology applied to teaching* (12th ed.). Boston, MA: Houghton Mifflin.
- Sommerville, C. J. (2006). *The decline of the secular university*. Oxford, England: Oxford University Press.
- Spender, D. (1998). *Man made language* (2nd ed.). New York: Pandora.
- Spiro, R. J., Coulson, R. L., Feltovich, P. J., & Anderson, D. (1988). *Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains*. Paper presented at the Tenth Annual Conference of the Cognitive Science Society, Hillsdale, NJ.
- Spiro, R. J., Feltovich, P. J., Jacobson, M. J., & Coulson, R. L. (1992). Cognitive flexibility, constructivism and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains. In T. Duffy & D. Jonassen (Eds.), *Constructivism and the technology of instruction*. Hillsdale, NJ: Erlbaum.
- Squire, K. R. (2003). Video games in education. *International Journal of Intelligent Simulations and Gaming*, 2(1), 49-62. Retrieved from http://www.educationarcade.org/research#journal_articles
- Stephenson, J. (1994). Capability and competence: Are they the same and does it matter? *Capability*, 1(1), 3-4.
- Stephenson, J., & Weil, S. W. (1992). *Quality in learning: A capability approach in higher education*. London, England: Kogan Page.
- Sternberg, R. J. (1988). *The triarchic mind: A new theory of human intelligence*. New York, NY: Viking.
- Sternberg, R. J. (1997). Cognitive conceptions of expertise. In P. J. Feltovich, K. M. Ford & R. R. Hoffman (Eds.), *Expertise in context. Human and machine* (pp. 149-162). Menlo Park, CA: AAAI Press/MIT Press.
- Sternberg, R. J. (2010). *College admissions for the 21st century*. Cambridge, MA: Harvard University Press.
- Sternberg, R. J., & Grigorenko, E. L. (2004). Successful intelligence in the classroom. *Theory Into Practice*, 43(4), 274-280.

- Sternberg, R. J., & Subotnik, R. F. (2006). *Optimizing student success in school with the other three rs: Reasoning, resilience, and responsibility*. Greenwich, CT: Information Age.
- Suppes, P. (1995). The aims of education. In A. Neiman (Ed.), *Philosophy of education* (pp. 110-126). Urbana, IL: Philosophy of Education Society, University of Illinois at Urbana-Champaign.
- Tashakkori, A., & Teddlie, C. (2010). *Sage handbook of mixed methods in social & behavioral research* (2nd ed.). Los Angeles, CA: Sage.
- The White House President Barack Obama. (2011). Education | The White House Retrieved September 8, 2011, from <http://www.whitehouse.gov/issues/education>
- Thompson, E. (2004). *Life and mind: From autopoiesis to neurophenomenology. A tribute to Francisco Varela*. Paper presented at the Phenomenology and the Cognitive Sciences conference, Paris, FR.
- Thompson, E. (2005). Sensorimotor subjectivity and the enactive approach to experience. *Phenomenology and the Cognitive Sciences*, 4, 407–427.
- Tisdell, E. J. (2006). Spirituality, cultural identity, and epistemology in culturally responsive teaching in higher education. *Multicultural Perspectives*, 8(3), 19-25.
- Trauth, E. M., Farwell, D. W., & Lee, D. (1993). The IS expectation gap: Industry expectations versus academic preparation. *MIS Quarterly*, 17(3), 293-307.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
- Twenge, J. M., Campbell, S. M., Hoffman, B. J., & Lance, C. E. (2010a). Generational differences in work values: Leisure and extrinsic values increasing, social and intrinsic values decreasing. *Journal of Management*, 36(5), 1117-1142. doi: 10.1177/0149206309352246
- Twenge, J. M., & Campbell, W. K. (2009). *The narcissism epidemic: Living in the age of entitlement*. New York, NY: Free Press.
- Twenge, J. M., & Foster, J. D. (2010). Birth cohort increases in narcissistic personality traits among American college students, 1982–2009. *Social Psychological and Personality Science*, 1(1), 99-106. doi: 10.1177/1948550609355719
- Twenge, J. M., Gentile, B., DeWall, C. N., Ma, D., Lacefield, K., & Schurtz, D. R. (2010b). Birth cohort increases in psychopathology among young Americans, 1938-2007: A cross-

- temporal meta-analysis of the MMPI. *Clinical Psychology Review*, 30(2), 145-154. doi: DOI: 10.1016/j.cpr.2009.10.005
- Tyack, D. B., & Cuban, L. (1995). *Tinkering toward utopia: A century of public school reform*. Cambridge, MA: Harvard University Press.
- U.S. Department of Labor. (2010). Number of jobs held, labor market activity, and earnings growth among the youngest baby boomers: Results from a longitudinal survey summary Washington, DC: Bureau of Labor Statistics.
- VanDeventer, S. S., & White, J. A. (2002). Expert behavior in children's video game play. *Simulation and Gaming*, 33(1), 28-48.
- Varela, F. J., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. Cambridge, MA: MIT Press.
- Varon, E. (2006). Management report—skills workers have versus skills CIOs need. *CIO*, (June 01). Retrieved from http://www.cio.com/article/21397/Management_Report_Skills_Workers_Have_Versus_Skills_CIOs_Need
- Washburn, J. (2005). *University, Inc.: The corporate corruption of American higher education*. New York, NY: Basic Books.
- Wentling, R. M. (1987). Teaching employability skills in vocational education. *Journal of Studies in Technical Careers*, 9(4), 351-360.
- Wilber, K. (2000). *A theory of everything: An integral vision for business, politics, science, and spirituality*. Boston, MA: Shambhala.
- Wolf, A. (1991). Assessing core skills: Wisdom or wild goose chase? *Cambridge Journal of Education*, 21(2), 189-201. doi: 10.1080/0305764910210208
- Wood, D. J., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychiatry and Psychology*, 17(2), 89-100.
- World Future Society. (2010). Outlook 2011. *Futurist*, 44(6), 1-9.
- Yang, B. (2004). Holistic learning theory and implications for human resource development. *Advances in Developing Human Resources*, 6(2), 241-262. doi: 10.1177/1523422304263431
- Yilmaz, S., & Seifert, C. (2009). *Cognitive heuristics employed by design experts: A case Study*. Paper presented at the meeting of the International Association of Societies of Design

Research, Seoul, Korea. Oral Presentation retrieved from
<http://www.iasdr2009.org/ap/Papers/Orally20Presented20Papers/Design20Creativity/Cognitive20Heuristics20Employed20by20Design20Experts20-20A20Case20Study.pdf>

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Los Angeles, CA: Sage.

Zemsky, R., Wegner, G. R., & Massy, W. F. (2005). *Remaking the American university: Market-smart and mission-centered*. New Brunswick, NJ: Rutgers University Press.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64-70.

Appendices

Appendix 1: Conference Board of Canada Innovation Skills Profile

INNOVATION SKILLS PROFILE	
Skills needed to contribute to an organization’s innovation performance — to produce new and improved products, processes, and services	
CREATIVITY AND CONTINUOUS IMPROVEMENT SKILLS	
THE SKILLS, ATTITUDES, AND BEHAVIOURS NEEDED TO GENERATE IDEAS	
Act and Contribute	Manage and Support Others
<ul style="list-style-type: none"> • Seek different points of view — explore options • Be adaptable and flexible when challenging ideas • Ask questions to assess situations, identify problems, and seek solutions • Rethink the way things are done — break the mould • Approach challenges creatively — think outside the box • Look for surprising connections — be open minded when exploring possible solutions • Put forward your own ideas with confidence • Look for new ways to create value in products, processes, and services • Suggest alternative ways to achieve goals 	<ul style="list-style-type: none"> • Demonstrate trust in other people’s ideas and actions • Nurture and promote creativity and inventiveness • Question and challenge the way you operate — think beyond individual and organizational comfort zones • Project a vision of where you want to go — keep the big picture in mind • Be open to new ideas and different ways of doing things — commit to continuous improvement • Monitor success to find ways to continuously improve • Recognize and reward original ideas and ideas for improvement
RISK-TAKING SKILLS	
THE SKILLS, ATTITUDES, AND BEHAVIOURS NEEDED TO TAKE CALCULATED RISKS AND BE ENTREPRENEURAL	
Act and Contribute	Manage and Support Others
<ul style="list-style-type: none"> • Envision a future in which your risk taking has paid off • Be open to and respond constructively to opportunities for change • Keep focused on what you are trying to achieve when suggesting alternative ways to get the job done • Assess risk, and manage your approach to risk — take appropriate risks when applying new approaches • Learn from your experiences — do not be afraid to make mistakes • Be willing to experiment with new ideas — commit to an action without knowing every outcome or consequence • Have the confidence to apply your skills in new and unfamiliar situations 	<ul style="list-style-type: none"> • Encourage individuals and teams to bring forward new ideas for action • Support risk by monitoring and evaluating decisions and actions • Be resilient in the face of setbacks, mistakes, and potential mistakes • Accept failures and learn from them • Recognize and reward risk taking
RELATIONSHIP –BUILDING SKILLS	
THE SKILLS, ATTITUDES, AND BEHAVIOURS NEEDED TO DEVELOP AND MAINTAIN INTERPERSONAL RELATIONSHIPS THAT SUPPORT INNOVATION	

<p>Act and Contribute</p> <ul style="list-style-type: none"> • Understand and work within the dynamics of a group • Build and maintain relationships inside and outside your organization • Engage others to make use of their skills, knowledge, and abilities • Share information and expertise — explain and clarify new and different ideas • Respect and support the ideas, approaches, and contributions of others • Listen and ask questions to understand what is new and different about others’ points of view • Accept and provide feedback and guidance in a constructive manner • Overcome barriers among people that may impede results — anticipate sources of assistance and resistance 	<p>Manage and Support Others</p> <ul style="list-style-type: none"> • Encourage, mentor, and coach others to share ideas and speak freely foster an atmosphere of open — mindedness • Involve others by delegating responsibility and supporting their efforts • Make it easy for groups of people to collaborate and deliver new solutions • Allocate resources for networking and sharing ideas, knowledge, and skills • Promote personal development in others so they are better able to contribute to a team • Provide honest praise and constructive criticism to teams • Recognize and reward the success of teams and groups of people
<p>IMPLEMENTATION SKILLS THE SKILLS, ATTITUDES, AND BEHAVIOURS NEEDED TO TURN IDEAS INTO PRODUCTS, PROCESSES, AND SERVICES</p>	
<p>Act and Contribute</p> <ul style="list-style-type: none"> • Access and apply knowledge and skills from across your organization • Adapt to changing requirements • Exercise ingenuity when devising, planning, and implementing solutions • Use the right tools and technologies to complete a task, project, or assignment • Plan for contingencies — be ready with alternative strategies • Be tenacious — show initiative, commitment, and persistence to get the job done • Accept feedback and learn from mistakes • Use measurements to show the value of a solution • Be accountable for what you and your group implement 	<p>Manage and Support Others</p> <ul style="list-style-type: none"> • Adopt and promote a “can do” attitude • Understand how change affects the performance of your organization • Be proactive in leading and responding to change • Empower employees to make decisions • Tolerate mistakes when trying out new ideas • Value, support, and reward initiative • Make change visible — highlight new and improved products, services, and processes • Measure the impacts of a solution on performance, productivity, and financial results

Appendix 2: Situation Summary List

Summarized Situations (condensed or paraphrased)

Dailies feedback. Some with tenure (all the way up to management) assume they know better and don't take input.
Meetings would be a common situation.
In bigger companies (over a thousand employees) novices arrive really passionate and idealistic about their creative contribution but they are told "you can't do that, you don't know what you're talking about." There's no creative license in the job. In smaller companies it's different because they have to be more agile. They get slaughtered in their first year, smacked down; the pie-in-the-sky gets wheeled back to reality. And after a while they submit to being in an assembly line, in a factory.
Some Managers don't understand the artist process and therefore misevaluate performance and mismanage the artist. Managers can hurt and stifle career progress. Managers tend to want people to be more manager driven and, task driven. But artists are not hired for those reasons but to do art (create). "if you take every animator and every artist, you put all their reviews together, they would all say the same thing, 'needs to work on communication, needs to be more assertive, needs to do more estimates, needs to learn Excel,' like everything besides being an artist."
Regarding promotions in a large corporation, people are trying to climb the corporate ladder in a high pressure situation and sometimes people will do some pretty sneaky things so you have to watch your back and have a paper trail.
A lead gets jealous or suspicious (lack of trust) and hassles the worker.
A person receives work that doesn't work but instead of bringing it up to whomever is accountable, the person fixes/changes it themselves and doesn't report it.
Novices step over boundaries and onto people's toes through body language and actions.
Friction in the team requires meetings and discussions between 2 people and sometimes with superiors.
Cliques tend to form by area, team, and hierarchy. When someone know (is friends with) higher ups or nongroup members, and especially if they switch clans it can cause ill feelings.
Alarming serious rumours can spread quickly and people have to decide what to do with the rumour when it comes to them (confront? ignore? participate?). It is complicated by survival realities when the rumours are likely accurate and harmful, e.g., the layoff of people, and political alliances are being made for protection.
Specific linear tasks in the pipeline, especially with proprietary technology have to be taught to novices. When novices are shown a process they are expected to learn it the first time and not have to ask how to do it again . Usually the common documentation is clear on this type of thing but novices must do whatever they need to so that they can do the work later by themselves. That usually means taking notes. Some processes and standards are not fully documented. Some aspects of production have grey area (e.g. hair style) and then it falls to intuition based on experience.

<p>Novices who don't know later stage process or the whole pipeline may want to create assets in a way that a supervisor or lead or team member will let them know would be better done differently, e.g., # of polygons that must be used, or color screen calibration, so it will work in the engine, or just look better). Novices sometimes don't pay heed. Novices must learn from others who have experience. When their work is late or is faulty or has to be redone they are seen as not pulling their weight.</p>
<p>Novices sometimes take time off or socialize too much at the wrong time, like when everyone is under a crunch. You can socialize if you are willing to put in OT.</p>
<p>Time management is tricky because even if the industry is 9-5 deadlines have to be hit regardless. Stress and crunch can come through external sources even with the best management practices. For example, Publishers are known to demand unreasonable changes or don't fulfil their side of the contract obligations, e.g., they don't make payments on schedule, they make outrageous changes, they freely add on to an already huge scope. Since they have the money and power, they can abuse it with developers, and if developers sue, then whether or not they win the developer won't be hired by any publisher after that.</p>
<p>Jobs are often project dependent and companies can hire and layoff quickly without much notice. It is hard on everyone to have someone integrated into a team then be laid off. From the employer perspective, hiring takes a lot of time and resources and people often misrepresent themselves, e.g., say they did AI on a game but really only copied and pasted certain code into the game.</p>
<p>High pressure and low on sleep brings out the best and worst in people. It is harder to deal with people when under extraordinary pressure. E.g., 2 killer projects simultaneously. One programmer was negative to an artist but he and the artist are both on the ragged edge. A manager can't let it go on but confronting it will likely lead to them quitting which will prevent the team from hitting its deadlines.</p>
<p>Moronic design suggestions can come from many places and they must be handled tactfully, especially when they come from higher ups. It is an even harder problem if the suggestion is not obviously moronic.</p>
<p>Conflicts associated with strong feelings occur. When it is between two people with a lot of power in company they may give conflicting visions and/or demands to staff.</p>
<p>Many issues stem from an overwhelming amount of work to do with no headroom. For instance, a 5 month project is scheduled for 3 months and then the publisher makes changes and/or adds more scope. So people are not doing good work because they are doing 80 hrs/week and it still isn't enough, and then technical issues arise under these tight deadlines, and so the game sucks.</p>
<p>It is a creative industry and entertainment products need variety. But burnt out and mentally dead people tend to not think creatively but grind things out taking easy solutions, pushing pixels and doing the mundane work. It is really hard to come up with clever creative solutions and to work smarter rather than harder when doing 80 hr weeks.</p>
<p>Lots of novices come out of a director's cutting room looking dazed and confused and attempt to do something but fall on their face. It would have been avoided if they would have just been clear and said "look, I have no idea what I'm doing." Admit that you have no clue. Everyone's been there, so everyone understands. No one is going to judge that. There are a lot of different backgrounds and no one can know everything or come with that knowledge but they don't want</p>

to look stupid or bad so they don't ask questions.
When novices get stuck they often suffer in silence and don't seek help. They don't want to bother anyone, or are nervous talking, or have trouble being outgoing or comfortable talking to their superiors and peers. The industry attracts people that are bit more socially challenged.
Novices come in so focused on impressing that they don't do what is needed or what is asked or appropriate for the context. They make it their own in order to try to show how clever or good they are instead of what the shot needs or what they have been told to do.
Novices gravitate towards very acute principles and become myopic . In school they learn a certain set of principles or rules and then tend to abide by them without realizing that there is an exponentially longer list of sub rules and principles. As they get better that list grows and grows and becomes a mental checklist of what works and looks good and what doesn't. For example, a student may get so focused on dynamic poses that they try to incorporate it into every pose and it becomes too much.
The context of problems is the pressure (e.g., maybe get fired) due to deadlines. Things go wrong, tech problems happen, things break, and people don't have the tools to fix them. But if your team doesn't hit the milestones the publisher might not pay, so it can cost the company thousands of dollars a day until the milestone is hit.
A meeting might not happen and a person will have to make decisions on their own knowing that their work must fit with what comes before and after in the sequence.
Dealing with a higher-up. Team members will at times have to deal with a Director. They will have to know what is appropriate to bother them about and how to talk to them, They must know the pipeline and where they and the director fit into it. For instance, they wouldn't ask Directors about technical problems.
Students go to events like Siggraph to network with industry people, but students often swamp them and come across as desperate, clingy, geeky, or too keen. They need to relax and treat the industry people like a real person. The industry people are not going to become their best friend just because they complimented them on their animation.
Collaboration requires daily interactions. Negative characteristics show up in meetings and conversations where they have to navigate problem solving with others, say about some feature.
Moronic clients have expectations that are way out of line. A lot of people just agree with anything the client wants, but that doesn't work down the line. Students need to learn to have conversations and negotiate clients down to reality.
Must be sure to see the big picture. Take responsibility to ask enough questions that they are clear of the big picture. For example, a character will be built differently if it needs to be animated later. They need to know if it needs to be FK or IK or switchable.
If someone doesn't have a good relation , or has a bad relation, with the IT guy , he is not going to go out of his way to help them. He should because it's his job but he might have six other things going on and they will be at the bottom of the list. Novices will want to build rapport such that they can just call up and say "how can I fix this," and the IT guy will tell them and not just sluff them off and say they'll have to wait.
Dealing with unruly coworkers .
Novices often expect the same level of, or the same technology that they had in school, but

<p>they may get stuck using old computers and software and equipment. Student also may have used cracked version and the company can't do that. Example, students will ask me why the company doesn't have PS on their computer because they are used to it being a standard and consider it basic.</p>
<p>It is dysfunctional if the team sees other members regularly not working, e.g., chatting about games (say at lunch), searching online for game tips, watching you tube about games. Output goes down, team spirit goes down and people get discouraged. Even a superstar who is able to do all their work in an hour a day can't act this way because it is a team effort and it affects the rest of the team.</p>
<p>Younger employees are so used to multitasking (e.g., Facebook, you tube, twitter) that they believe they work better. They might stream movies on one screen while working on the other and say that they are actually working faster this way. Other team members come by and see it that is bad, and if a manager comes by its worse, but if an executive comes by it is even worse.</p>
<p>Schedules are done up but then something always happens and schedules get changed and messed up and people get moved around.</p>
<p>Cross training (learning new skillset areas) can be good and bad. In some companies or departments there are many projects going on and people are assigned diverse tasks. This can be good if there is time for everything but it gets bad if not. People might feel that they can't get to the main job they were hired for because they are split into too many directions and multiple tasks (like having to do research or something), and then they complain. They also complain about cross training when there is not enough time or opportunity to practice the training but later they are expected to be able to do it. It happens at crunch-time because there is no time to hire or train anyone so management says, "hey, you learned that back when so jump in and get that work done."</p>
<p>Because technology changes so quickly people need to constantly share methods and tools and use the best for the job. But some people don't and end up not working fast enough, but they complain to colleagues about too long work hours. Some companies set standards for certain tasks so that if someone isn't hitting it they get additional training.</p>
<p>An artist is given an assignment, and instead of researching how to best do it, e.g., what tool to use, they just start doing it with what they know. So, they may spend days or weeks working on something that could be done in a few hours if they had been aware of the extra tools or shortcuts for their workflow. [also relates to perception of disorganized and no preplanning]</p>
<p>The company will keep adding work until a worker's maximum is reached. It is each person's responsibility to tell management when they have too much work and how they want to handle it.</p>
<p>It is the responsibility of the artist (though mostly of the lead artist) to ask questions to find out the big picture use and needs of an asset. Base models must account for everything the model will need to do in the game. So for instance in a boxing game, the base meshes must be able to handle impact, bruises, cuts, etc. If a base head is not made well, every character after that will have problems and that would mean going back and fixing every single character.</p>
<p>Taking critical feedback from someone above them sometimes is taken more as a suggestion and so is ignored or only half followed. Then later someone else has to finish it. This might result in the person getting fired or reprimanded.</p>

<p>Novices must be organized and write down a task log to avoid forgetting or missing their deadlines. Write down instructions and then repeat it back to hold people accountable for what they say, because sometimes they change their minds and they'll disagree that they said that or say you have misinterpreted them.</p>
<p>Scheduling and estimate changes affect the whole game and team and cause the need for constant reinventing.</p>
<p>Novices run into problems on a task but are often afraid to speak up or butt into conversations or ask. The consequences of this behaviour show up at the end of a timeline when it can't be hid anymore. Then others have to make up for the novices mistakes and bad vibes happen. It can become cyclic because then next time the novices are even more afraid to say anything. No one wants to be bugged all the time but there should be good communications and it is in everyone's interest to get them up to speed. And as long as they are the type of person that learns from their mistakes or that learns what the work around is for next time then after they have been taught they shouldn't need to be taught again.</p>
<p>People get distracted from work by diversions like the internet, foosball, food court, or hanging out. There are always people looking for excuses not to work. Each scenario has a particular time sensitivity relative to the pipeline. If there is no one else modeling on the team at that time and the employee gets distracted by You Tube, then there will be no model at the end of the day.</p>
<p>Novices can be thrown into a game team and expected to fit right in even though they are new and not confident and can't see the big picture. For example, it is easy to get lost and overwhelmed participating in their first stand-up. Some teams use Agile and have war rooms with big whiteboards and in 15 minutes the team goes through everything. People are talking and assigning tasks and novices are expected to know acronyms, software, cultural norms, where they're going, and how the company works. If a buddy/mentor is assigned but they are not very good and don't/can't explain then the novice is blind and lost and probably doesn't know who to ask for the most basic things.</p>
<p>Typically a project manager does estimates first, then talks to the team about it. When novices estimate it usually must be multiplied by two at least. Newbies need practice planning a task then executing it while incorporating and integrating it into the process iteratively because otherwise just because it is delivered doesn't mean it will work (match, fit, work).</p>
<p>A common situation is that people don't speak up and communicate risks, blockers, negatives, lateness, things that are going to take longer, etc. For example, a deliverable is missed and it turns out to be because someone else didn't deliver their part earlier but no one said anything the whole time and now the team is two weeks behind.</p>
<p>360 review system - sometimes things come out, like a lack of humility when they review themselves and others. 360s are hard to do and be accurate and communicate things in a way that will help people.</p>
<p>A failure throughout the industry is clearly defining and specifying expectations, like standards of what will be expected, goals, and alignment, and not just general items or deliverables.</p>
<p>In opinion threads (email, conversation) where important decisions are being discussed, for example on whether to include an element/feature from the game, things gets clouded, opinions get polarized very quickly, and people get over entrenched, e.g., it is either brilliant or it sucks.</p>

<p>It is common for the QA tester to under communicate by just saying something like “it doesn’t work,” then the coder tests it and says, “no it works,” and this goes back and forth instead of having a real conversation that investigates and gets to the root of the issue together. People can become standoffish about “I am right, there is nothing wrong with what I have done” “You’re an idiot, I am not” A great programmer will always be open to the possibility of their code not working right.</p>
<p>Projects get changed, cut, etc. - can’t get mad or take it personal.</p>
<p>Instructions can make perfect sense to the person giving them, e.g., designers and artists, but not to a programmer/engineer, and then instead of asking, the engineer might just assume what they mean. The person receiving instructions must know what questions to ask to push for clarity and context and to be sure they understand the intent with the person who wrote the doc to be sure they are meeting the needs.</p>
<p>Teams make games, not 1 or 2 individuals, so team dynamics require being able to sell your ideas and at the same time being professional about it if nobody likes it, and be able to change it and go back and have the perseverance to make it better so everyone will like it.</p>
<p>Team members must delegate difficult problems and orchestrate resources to get it done, and not just jump in and do it themselves.</p>
<p>In high pressure high stake situations failure has consequences. People are disciplined and fired. Consider how you would handle a situation in which there is a high pressure looming deadline, and you are responsible for 5 people telling you it can’t be done on time but it must be, missing the deadline is not an option.</p>
<p>Negative characteristics commonly show up during long hard days (like crunch mode) when team work is needed most</p>
<p>Negative characteristics often occur in the early stages of a project but don’t show up until the missed detail has compounded problems later</p>
<p>Negative characteristics commonly show up during daily routines in which the employee must be micromanaged</p>
<p>Arriving to work every day on time, and getting the work assigned finished when requested (daily duties)</p>

Appendix 3: List of Primary References Used in Defining Categories

Novice Negative Characteristics

Numbers in parentheses are from the 1st draft.

Poor Communication (19=13%, category 88=59%) cp [10=9%, category 49=42%]

- Communication
- Don't communicate, don't ask for help, struggle on own for too long
- Don't ask questions
- Won't speak up or ask
- Communication: not admitting a problem
- Don't ask, Lacks confidence
- Communication: don't speak up about risks, blockers, negatives, late deliverables
- Sit and struggle alone
- inability to communicate problem
- sit and try instead of just asking

misFit (18=12%) cf [9=8%]

- Fear of looking stupid, low self esteem
- "don't excel...in big companies"
- Insecurity - sneaky, etiquette, common sense
- Timidness
- Communication (lack assertive ability)
- Too shy/timid, nerdy, desperate
- Interpersonal problems, hang-ups, social issues
- Interpersonal issues (#1 problem)
- Communication issues, rifts

Superiority, Entitlement, Ego Myopic (17=11%) ce [9=8%]

- Not open to hearing other ideas
- Attitude, egos, lack of professionalism
- arrogant attitude (know it all)
- Arrogance
- Ego, primadonnas, don't take input, don't respect rules
- cockiness, over confident
- arrogance (know it all)
- arrogance (know it all)
- know it all (unconsciously incompetent)

Non-Collaborative (6=4%) cc [9=8%]

- Not thick skinned, too sensitive, too personally invested
- Insecurity - sneaky, etiquette, common sense
- Jealousy
- Lack leadership & collaboration skills
- Lack collaboration skills = people skills or entrepreneurial spirit
- Team issues
- Production staff don't push for clarity
- Collaboration
- Collaboration:

Defensive (15=10%) cd [7=6%]

- Fear of looking stupid, low self esteem
- Not able to take criticism (because of fear or independence 47:50 - 49:40)
- Poor behaviours: taking frustration out on others, freaking out, get emotional, being an "ass"
- don't Take direction & criticism
- defensive, not open to
- Not open to hearing other ideas
- Not thick skinned, too sensitive, too personally invested

Antisocial (10=7%) ca [3=3%]

- Poor behaviours: taking frustration out on others, freaking out, get emotional, being an "ass"
- talk out of turn, in your face, stubborn, argue and say you're wrong, my way is the best/only way, e-mail spam everyone complaining and ridiculing (poor communications not professional)
- Antisocial attitude/behaviour

Non-Accountable (4=3%) cn [2=2%]

- Accountability
- blaming (it's not about them)

Poor Work Habits (13%) wp [1 = 1%] [category 26 = 22%]

- lack sufficient learning ability [behaviour: doesn't make effort to learn]

Lax Work Ethic, <100% Work Effort (6=4%) we [12=10%]

- Unwillingness to document
- Lack self-management, time management
- Lack suitable work ethic
- Lack lifelong learning skills
- Inability to move forward (hit level of creative competence)
- Work ethic

- Unprepared for industry realities: autonomy, deliverables (time management), work ethic, Lack of holistic perspective, Impatience
- Work ethic, dues
- work ethic: don't do full day, not thorough, don't give 100% on every deliverable, distracted by non-job items, don't show up, lack Professionalism
- Lack Loyalty: quit, mercenary
- Work ethic
- Unreliable

Non-Initiating (8=5%) wi [8=7%]

- Unwillingness to document
- Lack self-management, time management
- work ethic: don't do full day, not thorough, don't give 100% on every deliverable, distracted by non-job items, don't show up, lack Professionalism
- Don't want to learn new things 5:08 - 13:31
- don't do research
- Perseverance
- lack of self-discipline
- Lack of initiative

Unorganized (5=3%) wo [5=4%]

- work ethic: don't do full day, not thorough, don't give 100% on every deliverable, distracted by non-job items, don't show up, lack Professionalism
- Unprepared for industry realities: autonomy, deliverables (time management), work ethic, Lack of holistic perspective, Impatience
- Poorly organized: naming issues
- Disorganized, lack discipline
- Lack of attention to detail

Holistic MetaPerspective Gaps (42=28%) h [42=36%]

1. Unprepared for industry realities: autonomy, deliverables (time management), work ethic, Lack of holistic perspective, Impatience
2. Inability to move forward (hit level of creative competence)
3. Idealistic, too much passion
4. Too eager
5. don't behave with expected Etiquette (ignorant of hierarchy, policies, procedures, politics)
6. Communication skills: overstepping boundaries (etiquette, hierarchy, politics)
7. lack holistic perspective of position and effects on others and outcomes
8. Idealistic or naïve (unreasonable expectations)
9. not critical enough of their work
10. Idealistic, naïve, unrealistic expectations, lack of realistic work ethic
11. focused on impressing
12. myopic use of same acute principles

13. wrong focus for passion (on job not art)
14. Unrealistic ideas and goals
15. self-awareness (what's important, want)
16. Indecisiveness (sitting on the fence)
17. role/job misconceptions, unrealistic ideas, naivety
18. Lack quick problem solving ability
19. unreasonable undoable solutions/decisions
20. Unaware of constraints & lack skills to deal
21. Unwilling to adapt
22. misperception of job & industry
23. Can't preplan for the future
24. Poor estimating, Don't see whole pipeline
25. Unrealistic ideas & expectations
26. Allow themselves to be taken advantage of
27. recognizing role on team
28. Lacks holistic perspective
29. Lacks awareness of self & mistakes (don't know what they don't know)
30. underestimate
31. Over step place in their enthusiastic
32. misalignment (at all levels) of expectations, goals, deliverable, and standards
33. Lack of holistic picture of business
34. not flexible
35. Naivety & fantasy of industry
36. Lack of self-awareness
37. Lack problem solving skills
38. Limited perspective
39. Holistic perspective "[they're] really good at solving problems, they just don't know what the problems are"
40. How to deal with failure or personal limits
41. Awareness of own limitations and admit
42. Lack ability to self-assess [so poorly self asses]

Ideal Characteristics

A - Fit with a collaborative culture [know, be, do] [includes aware participation, interpersonal-social skills, trusting & trustworthy, supportive, empathetic, humble confidence, communication, assertiveness]

1. Fit
2. determine the **culture** core values and how to **fit**
3. [always be looking and trying to use the] **right mind set for the culture**
4. [always be looking and trying to use a] better attitude to increase success rate
5. read the culture and context
6. figure out the culture and how to fit

7. Find out who to go to for what and do it [**structure**] - Talk to the team
8. Find out what is relevant and appropriate in the hierarchy
9. get to know team and chain of command
10. align with the team vision and goals and values
11. do the right thing
- 12. figure out how to get along**
13. team fit (get along and find interesting)
14. get along with colleagues and trust them
15. compatibility and make people comfortable
16. figure out how to relate to team members positively like friends
17. People Skills: Talk to people outside of immediate context of work
 - a. find commonality with diverse set of people, find a strategy to connect personally outside of work

----- [indicates previously coded elsewhere but collapsed here]

18. go around and talk to people
19. physically interact and co-create with the team and be sure needs and integration are clear
20. take the time and make the effort to communicate
21. go and ask - be loud enough to get what you need but not so much that you are getting too much attention (least intrusive manner)
22. Confidence comes with experience (the opposite of arrogance is being too quiet [shy])
23. Confidence
24. confidence
25. confident
26. feed others passion
27. support the team - work together for one
28. [give up being right and] have real conversations that investigates and gets to the root of issue together
29. get cooperation without force
30. Constantly share what you're working on and confirm you are on track (and take advice)
31. keep others informed
32. learn from team
33. care
34. work as hard as others
35. [support team] give others tools to be creative

B - self-starters with professional attitudes [includes organized, dependable, quick learner]

1. takes initiative
2. self-direction
3. Independence
4. discipline of mind
5. discipline
6. Anticipate what needs to be done and **take action**
7. set goal and complete

8. Use schedules to know what you need to be doing
9. time management
10. be on time
11. Predictability is a key virtue to management, and control of process is crucial.
12. Predictable
13. Reliable
14. Consistent
15. finish early and double check
16. Employability skills
17. strong employability skills
-
18. work smarter not harder.
19. do your research
20. how to **teach yourself** something
21. **learn** from mistakes
22. learn the work around so don't need to be taught again
23. learned really fast – [by observation and reflection]
24. passion, authentic excitement as an indicator of **learner** and **perseverance** through tough times and challenges
25. Realistic perspective driven by **Passion** that fuels **perseverance** and **striving for excellence**

C - enthusiastic participator [includes passion, adding value, high performance standards]

1. Enthusiastic
2. Professionalism
3. “Can do” type attitude
4. enthusiastically participates fully in all jobs
5. enthusiasm
6. mentally prepared himself for the hammer
-
7. Realistic perspective driven by **Passion** that fuels perseverance and striving for excellence
8. Passion.
9. passionate about what they do
10. passion
11. Passion
12. passion, authentic excitement as an indicator of learner and perseverance through tough times and challenges
13. **take others' advice and input** and...
 - a. ... **own it & innovate on it**
14. innovate and **add value** - Contribute to the long run big picture
15. always be looking and trying to **add value** to your company,
-
16. really give it their all
17. go beyond the call of duty and pull off the impossible
18. go the extra mile to get the job done

19. exceed expectations
20. push for quality to make sure it is done better than what you expect
21. push the envelope

22. roll with the punches - bite the bullet and do whatever it takes to get the job done.
23. putting in the hours
24. trooper

D - personable, [includes NV Communication, socialness]

1. personable
2. great communicators
3. great communicator
4. communicate
5. fun
6. nice
7. easy to talk to
8. nurturing friendly non-intimidating
9. not a moocher but a nice person.
10. social skills
11. helpful and social
12. outgoing within reason
13. pleasant personality
14. have fun
15. able to understand the perspective from the other person's perspective

16. handle conflict
17. learn to handle arguments or disagreements positively
18. didn't get emotional (displayed positive emotion)
19. didn't take things personally
20. let it roll off your back (don't go emotional or freak out and stress out), be a nice human being
21. no ego, cooperative, no hang-ups, benefit of the doubt
22. not let it affect you. If it starts to affect work then speak to HR.
23. focus on what needs to be done and don't take offense at what others do

8

E - [self-aware] [includes , humbleness, honesty, open to feedback and personal change],

1. humble, accurate self-assessment,
2. humble enough to learn
3. strong and mouldable
4. don't BS but become **[self]aware** of your limitations and be open to admitting them and learning
5. **Admit** cluelessness, communicate clearly what you need
6. ask questions
7. honesty, ask for help

8. figure out how to deal with failure and your own limits
9. Willing to listen
10. **willing to learn**
11. willing to change
12. figure out how to **take criticism** well
13. take direction - especially with someone experienced
14. take feedback

F - [Holistic] breadth of knowledge in many eclectic and related areas [includes aware seeking of big picture context for job to industry and life for decisions]

1. (see) plan ahead
2. breadth of thinking/knowledge
3. craftsman's attitude: **get involved in understanding** the process and being very **patient** with it and create the **best** possible product for any given task
4. **Anticipate what needs to be done** and take action [anticipate requires holistic information]
5. look for the **big picture** so that you can anticipate the unexpected
6. innovate and add value - Contribute to the **long run big picture**
7. Industry knowledge
8. Understand industry and know what they are looking for [prior to understanding company or team]
9. understand pipeline
10. see the whole
11. job competence in context of **big picture** and dependencies
12. **aware** of what they want out of my job and focus on it if compatible with the company needs

G – Delivers Results

1. It's all about results. It doesn't matter what you look like or rules
2. Focus and drive
3. hard work ethic
4. work hard
5. get the work done and well
6. get the job done with as little supervision as possible
7. hit deadlines
8. punctuality on deliverables

H - Technical Competence

1. technical competence
2. technical skills
3. technical skills
4. have skills
5. Specialized, focused skill sets at a uniquely higher level than any other candidates
6. deep knowledge of subject area
7. job competence in context of big picture and dependencies

I – Talent & Creativity

1. artistic talent
2. super talented
3. talent
4. Talent
5. Talent
6. very talented

-
7. creativity
 8. practice creativity
 9. open to try things to improve (new workflows and improvements)

Expert Characteristics

Awareness of Self and Others applied to interpersonal and team communication & relations

Aa. Build Nurture and Manage Relationships

1. **people management** skills adapt to situations, negotiate viewpoints or project funding
2. Communication. Essential to know how to get cooperation without force.
3. ability to disagree w/o arguing. Because some of the people are hard to get along with.
4. Diplomacy and People skills: ability to get people on board and maintain the focus of the design.
5. for designers it is all politics: how to interact, open minded yet critical and having an opinion.
6. willing to work with people. Open minded, good to work with. Not arrogant and looking down on people.
7. leading with positive attitude: always put a positive spin on things, have a glass half full perspective,
8. Lead animators are able to interact in a nurturing friendly non-intimidating way feed passion, give [to others the] tools to be creative, that's how they get there, not to be a moocher, to be a nice guy.
9. successful people get the respect of their team, they get their team behind them to see their vision
10. a leader needs a **clearly communicated vision**
11. fantastic communicators that can **mentor, teach, present**
12. desire to coach and mentor
13. Management: ¬Communicate decisions constantly, let people see that we are moving forward [more about leadership than expert]
14. when something bad happens they boost the moral and view it more positively by getting to know you and play off your strengths, not criticize but give positive input.
15. **Personableness** would be a trait of a veteran.
16. Attitude is very important very talented jerks didn't last. But those with great attitudes are still here.

17. Being nice is always a good thing
18. are nice, someone you want to go for a beer with.
19. Friendly

Ab. Unpretentious Open Self-Awareness (used to support & motivate & grow)

1. **Aware** of their own communication issues and take it into consideration when they are wording their communications, or in how they interact.
2. self-awareness is very big. If you know you don't know then you are open to learn and listen. If you aren't aware then failure
3. self-awareness a thirst to know what you don't know
4. Can self-diagnose own work with a good experienced eye (deep awareness of subtle elements and how they fit together and what will work and why) (e.g., timing)
5. Humbleness: if you think you're already good, you probably are not. The next level has unbelievably creative people who don't see that they are.
6. **learning from everyone** (above and below)
7. Listen to seniors
8. being able to Take direction well and criticism well

Ac. Collaboration

1. Teamwork
2. Team oriented
3. collaboration
4. social & networking skills (whether inside or doing research for a project)
5. social interpersonal awareness
6. Management: dealing with people to keep **harmony** and working together to meet demands of Time, quality, and budget. Also interfaces with the publishing partners
7. Management: keep everyone happy, moving along, and motivated. The rest of it is easy
8. Management: relationship building is the most challenging, I have to firefight a lot.

Ad. Communication and Rapport (across disciplines and personalities)

1. Good rapport with others good relationships
2. compatible, socially able to mesh. make others comfortable and at ease, smooth things out
3. ability to work in teams. Ability to **understand each other** (cross discipline. Artist understand developers and vice versa, their jobs and lingo)
4. can **communicate** with unlike people, e.g., Programmers and artists work together
5. communication skills. ability to communicate with all the disciplines (art, code, game designer, sound)
6. very clear communication and presentation skills to make it clear to team is huge
7. communication skills listen well, ask really good questions, make sure they understand the context and needs, or explain your ideas and thoughts and expectations

Ba. Holistic Broad & Deep Foundation (for problem solving & decisions in complex situations)

1. crossover and function in many other areas (diversity of experience in many domains). We start as Generalist but then when you become an expert in many domains that's when you become a guru.
2. The experience of finishing a game involves all the aspects, including estimating and prioritizing and problem solving, and time management skills. If a person has shipped 2 games in 3 years that is more relevant experience than someone who has 10 years' experience but no games shipped.
3. able to see big picture of how a game comes together and all the elements involved
4. holistic view of the whole development process, understands all areas and how they fit together
5. critical eye [developed through lots of practice and trial and error and study]
6. deep knowledge of their area.
7. understand their discipline
8. Have realistic ideas of the industry and job demands
9. Have realistic ideas of what is possible.(scope)
10. knowing what effort is required, time, project management
11. understanding what can get away with w/o losing necessary quality
12. knowing technical limitations before they come up
13. Identify risks, see big picture, spot problems ahead of time.
14. good analytical skills to anticipate problems and avoid blind alleys
15. clear about their needs and wants and have an effective balance personal and corporate needs and wants and happiness
16. understanding priorities, what things to focus on given constraints like time. Estimating based on what to prioritize based on identifying return of investment trade offs
17. Veterans understand what makes a game fun for consumers. [It is not what you like but what is best for the project]

Bb. Problem Solving & Decision Making

1. Critical thinking, problem solving. Someone everyone looks to solve problems. The ones that can see the big picture and connect the dots, who can very quickly eliminate the noise and get right to the root cause
2. Able to see both the surface and analyze the depth, including interactions and game play. (programmers) See big picture, see the future in the present, the dependencies, e.g., one small rule change can completely change the game
3. able to assess complicated problems fast, explain it to team, show how to fix it, estimate time, get the right people on the task, and get it delivered on time (calls this "leadership")
4. a pragmatism: clever problem solving, ability to quickly problem solve between grander scale of design and the practical realities of production
5. Veteran is unconsciously competent (4 stages of learning)
6. has developed (unconscious competence in) foundation skills and knowledge to base decisions and consideration of alternatives
7. good tool box of techniques and tools for solving problems across many types of needs and problems, contexts, and situations
8. **ingenuity and innovation** applied to getting the job done (rather than to the product itself)

9. finding creative ways around the inevitable tech issues
10. translating an artistic or design vision into actual tasks that have to be done
11. software agnostic - define problem 1st then go to tool [not tool or process myopic]
12. know where to find needed info from multiple streams (people, web, books, etc.)
13. More aware of the need for testing [a specific knowledge that is not obvious without full experience]

Passion for Profession (that acts as fuel)

Ca. Committed Perseverance (in the pursuit of excellence)

1. passion: they keep their passion as a focus; and goal dedication and perseverance.
2. Passion: they love what they do
3. passion
4. #1 Passion
5. “Can do” attitude. Passion that goes beyond the call of duty and pull off the impossible.
6. work is their passion (work = passion = interest/hobby) is probably be a characteristic of successful veterans.
7. Passion about the art and work (not about money/job)
8. do it because they love it. Look past the bad and annoying and frustrating and keep the passion and not get jaded. Focus on goals
9. Enthusiasm (want to work and do exceptional work) [on top of tech skills]
10. Perseverance w/o persistence [without being annoying]
11. Stamina (easy to get burnt out)
12. [innovate] Challenge things, question, looking for better ways. Creative Improvement add value and make things better:
13. always looking for ways to improve.
14. get really good at one little aspect you focus in on, one thing that you really like, and be dedicated to keep trying, not giving up
15. #4 Productive at a high quality
16. technical competency in their field.

Cb. Lifelong learning & Adapting to Change

1. having the drive and passion to stay aware e.g., game market, related fields, types of games, technology, consumers wants
2. Constant desire to learn => inquisitive nature. Otherwise your competence is outdated in a year.
3. knowledge hungry (learning and willing to learn), can't know everything
4. Desire for continuous learning Stay nimble and current
5. want to learn new things
6. adaptability to change is necessary
7. Curiosity
8. “Staying current, know what is happening in the industry”
9. Visionary, Creative mindset, people who have their own distinctive look are generally creative and innovative (trendy but stand out).

Professional Demeanour

Da. Appropriate Professional Work Ethic & Values

1. strong **work ethic**
2. pull their weight
3. #3 Dependable
4. being organized, structured, methodical, systematic, detail oriented and really paying attention.
5. more organized because they expect situations and catalogue issues that will apply to future projects.
6. Attention to Detail and rigor
7. Lots of documentation pre-production and planning makes things go smoother
8. paperwork/documentation
9. Maintain enthusiasm and optimism (do not succumb to complacency and systemic cynicism)

Db. Calm and Confident in Stressful Situations

1. Focused in high pressure zones
2. Calm and assured. Confident in skills. laid back and assured
3. confident in opinions in area of expertise
4. confidence about what you do know and believe it is right, and know when it is really warranted
5. Confidence level. so familiar that it is second nature. You get there through a constant desire to learn
6. takes charge, not afraid to make decisions
7. Management: decision making without hesitating [more about leadership than expert]
8. entrepreneurial abilities and business sense to drive your vision and ideas
9. not getting frustrated, not letting project overwhelm your ability to detach

Dc. Self-Managed and Self-Directed

1. take **responsibility** for work load and telling management when they have too much, and how they want to handle it
2. the truly exceptional [are accountable] are great at what they do and are great people
3. low supervision – own it, run with it, no micromanaging
4. discipline of mind.
5. Disciplined
6. set goals and follow through.
7. #5 Able to meet or exceed deadlines

Appendix 4: Conference Board of Canada’s Employability Skills Profile 2000+ Weighted for Relevance to Research Categories

The table below presents the ES skills in their exact wording and categories with a Relevancy Weighting for each skill indicating how close it matched the analyses result from interviews. Comments regarding the overall match are “[]” bracketed.

Conference Board of Canada’s Employability Skills Profile 2000+ weighted for relevance to research categories		Relevancy Weighting
		Average 4.85
Fundamental Skills	(Average Weighting: 3.9)	
Write and speak so that others pay attention and understand [communication]		4
Listen to understand and learn ; ask questions and appreciate the views of others		5
Read, comprehend, and use written materials, including graphs and charts		2
Think critically and act logically to evaluate situations; solve problems, and decide		5
Identify the root cause of a problem		5
Share information using a range of technologies – voice, email, computers		2
Locate, gather and organize information using appropriate technology and information systems		3
Observe and record data		2
Make estimates and verify calculations		4
Understand and solve problems involving mathematics and use the results		2
Use technology, instruments, tools and information systems effectively		2
Access and apply specialized knowledge from various fields		6
Implement solutions		6
Continue to learn for life		6
Personal Management	(Average Weighting: 5)	
Demonstrate positive attitudes and behaviours: self-esteem, confidence, honesty, integrity, personal ethics, initiative, energy, persistence to get the job done		6
Deal with people, problems and situations with honesty and integrity		6
Recognize good efforts [??? Compliment people?]		4
Commit to learning, growth, and personal health		6
Set goals and priorities in work and personal life		6
Assess, weigh and manage risk		6
Be socially responsible and contribute to your community [if community includes work then 6]		2
Work independently or as part of a team		6
Carry out multiple tasks or projects [??? Complexity, multitasking? Assume handle complexity]		4
Learn from mistakes and accept feedback		6
Plan and manage time, money, and other resources to achieve goals		3
Be accountable for actions taken		6
Be adaptable with a positive attitude toward change		6

Recognize and respect diversity and individual differences	5
Be aware of personal and group health and safety practices and procedures	2
Be creative – identify and suggest new ideas to get the job done	6
Teamwork Skills	(Average Weighting: 5.9)
Understand and contribute to the organization’s goals [mostly in the negative characteristics: naivety, ignorance, entitlement, but also in ideal: add value]	6
Ensure that the team’s purpose and objectives are clear [mostly in the negative characteristics around not communicating, but also related to collaboration]	6
Be flexible [a gap in negative characteristics and identified as necessary for the industry that changes quickly, and mentioned as an ideal and expert characteristic]	6
Accept and provide feedback [often mentioned as a missing ability and discussed under causes that include systemic education, as well as described as a characteristic of the exceptional novice]	6
Lead or support where needed [discussed in relation to experts being looked up to as leaders, particularly in stressful difficult situations]	6
Manage and resolve conflict [one of the interpersonal characteristics]	6
Understand and work within the culture of the group, respecting others’ opinions [mostly in the comments about collaboration needs and gaps]	6
Plan and make decisions with others and support the outcomes [less specifically mentioned but highly related to collaborative work]	5
Exercise ‘give and take’ to achieve group results [mentioned in the negative characteristics and in interpersonal and collaborative skills]	6
Work to agreed quality standards [I interpreted this in the context of collaborative work in which members must find out and do what is required for the project and not pursue their own interest or opinion if it differs from the group/agreed standards]	6
Continuously monitor the success of a project and identify ways to improve [reflection in action and adding value described an exceptional novice and an expert]	6

Below are some sample game developer interviewee references (coded as Negative Characteristics) that were considered to align sufficiently with the ES item Understand and Contribute to the Organization’s Goals to warrant the Relevancy Weighting as the highest rating of 6. Each reference is from a different respondent, so this represents nine respondents.

- Students ... don’t see the big picture and importance of every job
- ... have wrong perception of what the industry is and needs

- ... study how other people are doing things and success of other companies, and if you're not, and not seeing how others are making games then you are not going to be able to do that well
- lack of holistic big picture ... they don't understand the process as a whole
- I don't know if they are necessarily able to understand the industry as a whole
- Students will ask me why the company doesn't have PS ... But they don't realize that it costs \$2k and it is not a significant part of their job
- Lack understanding of organizational structure, hierarchy, etiquette expectations...
- Whatever it is you have preconceptions about the industry, it's not like you think it is
- We value people that try to add value and make things better - questioning, looking for better ways

Appendix 5: Interview Guide

Survey Questions for those in Industry:

Describing Expertise and Gaps

What do you believe are 3-5 contenders for the most important critical characteristics or behaviours that veteran experts have that are required for success in the Game Development industry, rated in order from 1 to 5?

#1 characteristic/behaviour

#2 characteristic/behaviour

#3 characteristic/behaviour

#4 characteristic/behaviour

#5 characteristic/behaviour

I. What do you believe are 3-5 contenders for the most common and serious negative characteristics or behaviours that novices have that must be improved if they are to become successful in the industry?

#1 negative characteristic/behaviour

#2 negative characteristic/behaviour

#3 negative characteristic/behaviour

#4 negative characteristic/behaviour

#5 negative characteristic/behaviour

Common situations that gaps become evident

II. What have you observed as being the 3-5 most common types of situations where the negative characteristics or behaviours identified in the previous question become evident or cause serious issues (i.e., what are the most significant situations that employers wish new employees could deal with more effectively)? Please relate situation #1 to characteristic #1 in the previous question, situation #2 with characteristic #2, etc.

#1 Situation

#2 Situation

#3 Situation

#4 Situation

#5 Situation

III. For each **situation** above, what would be 1-3 ways **novices** would most commonly **behave** that would be considered ineffective (by more experienced industry veterans)?

#1 Situation

#2 Situation

#3 Situation

#4 Situation

#5 Situation

IV. For each **situation** above, what do you think would be the most **ideal** way that industry professionals should behave or deal with the situation?

- #1 Situation
- #2 Situation
- #3 Situation
- #4 Situation
- #5 Situation

Do you think that production teams have different perceptions and/or standards of and ideal employee (competence) than management or HR?

No ___

Yes ___ If yes, try to describe the differences the best you can.

Possible reasons for common gaps

V. For each of the common and serious negative characteristics or behaviours that new employees have (listed in question II) what do you believe are the most likely reasons or source of the lack? Examples: lack of natural talent or ability, lack of experience, poor training/education, immaturity (age), an ineffective generational characteristic such as entitlement, emotional or psychological problems, wrong personality for the industry or position.

#1 _____

#2 _____

#3 _____

#4 _____

#5 _____

Education as a preparation for industry success

What, if any, beliefs or ideas or suggestions do you have for educational institutions that might result in better equipped graduates?

#1 _____

#2 _____

#3 _____

- Would you characterize vocational programs to have the right balance between technical skills and higher-level critical thinking, communications, and collaboration skills and experience, on average?

- Which characteristics of expertise would you consider yourself to have mastered and which are your weakest areas?

In closing, please let the researcher know if you agree with either of the following:

I give permission to contact me for clarification or elaboration of my answers

I would like to be notified as to where I can view the completed thesis

Any final comments or questions?

For those in Educational Institutions (management, dept heads, instructors, students)

Clarity Level (or level of confidence that you are clear) as to what is the...]

1 zero clarity 2 mostly confused with a little clarity 3 a little more confused than clear

4 a little more clear than confused 5 mostly clear with a little confusion 6 totally clear

Confidence Level

1 zero confidence 2 a little confidence 3 some confidence

4 reasonably confident 5 very confident 6 totally confident

Program information:

Length in years?

Academic award bestowed?

Cost for entire program?

Content or areas covered?

As best you can, summarize the **general educational philosophy and methodology of the educational institution** you are involved in.

Clarity Level that this is the institution's official educational philosophy and methodology:

1 2 3 4 5 6

2. As best you can, summarize the game development (or related) **program's** general educational philosophy and methodology **if different than the institution.**

Clarity Level that this is the official program philosophy and methodology. 1 2 3 4 5 6

As best you can, summarize the top overall **educational objectives and outcomes** for the GAME DEVELOPMENT (or related) program.

Clarity Level that this is the program's official objectives and outcomes 1 2 3 4 5 6 [1

zero confidence --- 6 totally confident] Rate your level of confidence that the program outcomes are:

Relevant 1 2 3 4 5 6

Necessary 1 2 3 4 5 6

Complete or Sufficient 1 2 3 4 5 6

What methods does your institution use to ensure the program outcomes are relevant?

necessary?
complete and sufficient?

Do think there is a **general identifiable culture** in the Game Development industry as a whole, **some identifiable typical characteristics**, or **no identifiable culture** at all?

Please comment on how you see the relevance of an educational program's culture paralleling an industry culture. **Does your program culture parallel the industry culture?**

Would you characterize vocational programs to have the right **balance between technical skills and higher-level critical thinking, communications, and collaboration skills and experience**, on average?

Which characteristics of expertise would you consider **yourself to have mastered** and which are your **weakest** areas?

----- if not doing industry -----

I want to fill out the industry survey section OR I want to skip the industry section

What do you believe are 3-5 contenders for the most important critical characteristics or behaviours that veteran experts have that are required for success in the Game Development industry, rated in order from 1 to 5?

What do you believe are 3-5 contenders for the most common and serious negative characteristics or behaviours that novices have that must be improved if they are to become successful in the industry?

In closing, please let the researcher know if you agree with either of the following:

I give permission for the researcher to contact me by email regarding clarification or elaboration of any of my answers given in this survey.

I would like to be notified as to where I can view the thesis once it has been completed.

If you have any additional comments for the researcher please share them here?

If your expertise is primarily Educational rather than production, skip the industry questions here

Any final comments or questions?

Demographics

Name (optional):

Company (optional):

Country (optional):

Email Address:

Phone Number (optional):

If you have attended, or are now attending college or university select the description closest to the institution you attended or are attending

NA

Public university

Public college

Private university

Private college

Other, please specify

If you have attended, or are now attending a college or university what year did you graduate or will you graduate?

If this is not applicable to you then just leave it blank.

Year graduated or will graduate from:

A Game Development related program

A non-Game Development related program

If you have attended, or are now attending a Game Development related program which of the following **LEVELS** and **LENGTHS** are closest to your program

NA: I have not and am not attending a Game Development Program

LEVELS

Post graduate, Master, or PhD level program

Degree

Post Diploma

Diploma

Certificate

No designation

LENGTHS in years: 4 3 2 1 Other, please specify

How many years (if any) have you been working professionally in the Game industry?

16+ 10 – 15

5 – 9 2 – 4

Less than 2

0, NA

What is your main professional Game Development area or areas of expertise? This could also be your main job area, or most common Position Title, or, if you are still a student, your area of study?

NA

Art (including animation, modeling, environments, VFX, technical arts, etc.)

Game Design

Programming
 Audio
 Project/Production Management
 Other Management, e.g., business, finance, marketing, HR, etc.
 Other, please specify

Approximately how many employees are there in the game company you (primarily) work for? If you work for a **LOCAL** company owned by a **PARENT** company please estimate the size of both.

NA

PARENT 1 — 50 51 — 200 200 — 500 >500

LOCAL 1 — 50 51 — 200 200 — 500 >500

Which of the following comes closest to describing the type of game company (parent company) you work for (or if you are an independent contractor that you typically or most often work for)?

NA
 Major developer
 Independent
 Publisher
 Other, please specify

What type of games does your location or shop primarily work on (or if you are an independent contractor that you typically or most often work on):

NA
 Console or Arcade
 Hand Held console
 Mobile phone / iPhone
 PC
 All
 Other, please specify

Your Age range: <19 19 – 20 21 – 25 26 – 30 31 – 40
 41 – 50 51 – 60 61+

Select all that apply to you:

I am an experienced industry professional in the game development industry
 I am a relatively new industry professional in the game development industry
 I am primarily a self-employed contractor in the game development industry
 I am a recent graduate of an academic game development program

I am an instructor/mentor or advisor to an academic game development program

I am a manager, administrator, or curriculum developer for an academic game development program

I am a current student in an accredited academic game development program

Choose how you will continue:

My expertise is primarily education and therefore I will fill out the education section only

My expertise is primarily industry and therefore I will fill out the industry section only

My expertise covers both education and industry therefore I will fill out both the education and industry sections

Appendix 6: Interviewee Pseudonyms and Background Information (Complete)

Interviewee Pseudonyms and Background Information Code Meanings					
Column	Code	Meaning	Column	Code	Meaning
B	f2f	Face to Face	(all)	NA	Not Applicable
	Sk	Skype	(all)	un	Unassigned
	Srv	Survey	(all)	O	Other
D		Type of academic involvement			
	1	Instructor, mentor, or advisor to an academic game development program			
	2	Manager, administrator, or curriculum developer for a game development program			
E	1	Diploma or equivalent	J	1	Experienced Game industry prof
	2	Bachelor or equivalent		2	Novice Professional
	3	Master or equivalent		3	Intermediate Level of Prof Experience
	4	PhD or equivalent	K		Production platform used by comp
	5	Certificate or equivalent		1	All or most
G	1	1990-1999		2	Console and Arcade
	2	2000-2005		3	PC
	3	2006-2010	L		Type of company working at
	4	1970-1979		1	Developer and Publisher
	5	2010+		2	University
H		Area of Expertise			
	Art	Art		3	Independent
	PM	Production Management		4	College
	Tec	Technology		5	Major Developer
	Gde	Game Design	M	NA	NA or Self Employed (contractor)
			O	1	Multi company types

Interviewee Pseudonyms and Background Information Code Meanings					
Column	Code	Meaning	Column	Code	Meaning
	Au	Audio		2	Publisher
	SM	Senior Management		3	Major Developer
	SE	Software Engineering, Programming		4	Developer and Publisher
I	1	16+ years in industry		5	Other Industry
	2	10 -15 years	Q	M	Male
	3	5-9 years		F	Female
	4	2-4 years	R	Ca	Canada
				US	United States

Interviewee Pseudonyms and Background Information																	
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	A	R
Interview Date	Interview Type	Pseudonym	Educator Type	Education	Game Prgm Alumni	Year Graduated	Expertise Area	Ind Experience	Consider Self a Veteran?	Dev Platform	Comp Type	Local Comp Size	Parent Comp Size	Previous Comp Type	Age Range	Gender	Country
8/18/10	f2f	Gandalf	1	1	yes	1	Art	2	1	A	1	>500	>500	5	31-40	M	Ca
8/20/10	f2f	Charles Kane	2	4	no	2	GDe	NA	NA	NA	2	>500	NA	NA	31-40	F	Ca
8/23/10	f2f	Jacqueline Natla	1	2	no	un	Aud	1	1	A	3	NA	NA	1	31-40	M	Ca
8/23/10	f2f	Sophia Leigh	NA	1	yes	2	Art	4	2	A	1	>500	>500	NA	26-30	M	Ca
8/24/10	f2f	Amanda Evert	2	2	no	1	GDe	2	1	A	3	1-50	NA	1	41-50	M	Ca
8/25/10	f2f	Janice	NA	1	yes	3	Art	4	3	NA	1	1-50	>500	NA	26-30	M	Ca
8/26/10	f2f	Laura	1	1	yes	2	Art	3	1	C	3	200-500	NA	5	26-30	M	Ca
8/27/10	f2f	Jerome Johnson	NA	2	no	3	Art	4	3	NA	3	51-200	NA	NA	26-30	F	Ca
8/31/10	Sk	Kristina Boaz	NA	3	no	3	PM	3	1	C	3	1-50	NA	NA	31-40	F	US
9/07/10																	
10/05/10	f2f	Margot Carvier	2	1	yes	1	Art	2	1	A	3	NA	NA	NA	31-40	M	Ca
9/02/10	f2f	Anaya Imanu	1	5	NA	1	Art	2	1	A	1	>500	>500	5	31-40	M	Ca
9/02/10	f2f	Marco Bartoli	1	1	yes	2	Art	3	1	A	1	>500	>500	NA	26-30	M	Ca
9/07/10	Sk	Alister Fletcher	NA	2	no	3	PM	2	1	A	3	NA	NA	1	31-40	F	US
9/15/10	f2f	Gianni Bartol	2	2	no	4	Art	1	1	NA	4	51-200	NA	5	51-60	M	Ca
9/20/10	f2f	Larson Conway	NA	NA	no	NA	O	4	2	A	1	>500	>500	5	31-40	F	Ca
9/25/10	f2f	Werner Von Croy	NA	2	no	1	PM	2	1	A	5	51-200	>500	2	41-50	M	Ca
10/04/10	f2f	Amelia Croft	NA	2	no	2	PM	3	3	C	3	1-50	NA	5	31-40	M	Ca
10/05/10	Sk	Chan Barkhang	1	3	no	1	Tec	4	1	A	1	>500	>500	5	41-50	M	US

Interviewee Pseudonyms and Background Information																	
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	A	R
Interview Date	Interview Type	Pseudonym	Educator Type	Education	Game Prgm Alumni	Year Graduated	Expertise Area	Ind Experience	Consider Self a Veteran?	Dev Platform	Comp Type	Local Comp Size	Parent Comp Size	Previous Comp Type	Age Range	Gender	Country
10/07/10	f2f	Totec	1	NA	no	NA	SM	2	1	A	3	1-50	NA	3	61+	M	Ca
10/11/10	f2f	Pierre Dupont	NA	4	no	1	Tec	2	1	A	1	51-200	>500	5	41-50	M	Ca
10/15/10	Sk	Patrick Dunstan	2	4	no	3	PM	NA	NA	NA	2	>500	NA	5	41-50	F	US
10/20/10	Sk	Yarofev	2	4	no	4	SE	NA	NA	NA	2	>500	NA	5	61+	M	Ca
10/27/10	Sk	Qualopez	2	2	no	1	Tec	2	1	A	1	51-200	>500	5	41-50	M	Ca
Jul-10	Srv	Jean-Yve	2	4	no	5	O	4	NA	PC	2	NA	NA	NA	31-40	F	un
Jul-10	Srv	Semerkhe	1	2	yes	3	Art	3	un	NA	4	NA	NA	un	un	M	un
Jul-10	Srv	Tony	2	2	yes	un	Art	3	3	NA	4	51-200	NA	4	31-40	M	Ca
Jul-10	Srv	Puna	2	2	yes	un	Art	3	3	NA	4	51-200	NA	4	31-40	M	Ca