

Ambiguity Intolerance and the Adult Online Learner

Dan Clark
Valley City State University
Valley City, North Dakota
dan.clark@vcsu.edu

Abstract: As Web_2.0 technologies redefine the learning space, apprehension in the adult learner toward technology and alternative instruction could represent a significant barrier to an effective teaching and learning experience. Although tolerance for ambiguity has been highlighted as important in the development of creative, integrative thinking in the college setting, few studies have examined ambiguity tolerance and anxiety in response to uncertainties introduced in the virtual classroom. This presentation will share the design and initial results of a mixed methods study to ascertain the effect of meta-instruction in ameliorating ambiguity intolerance in the adult learner in innovative or atypical learning environments.

Introduction

Amid the shifting educational landscape of the new millennium, the future of instructional innovation – and perhaps higher education as a whole – lies at the crossroads between non-traditional students and non-traditional delivery methodologies. Today's Web_2.0 society has created students (both full and part time) who are increasingly demanding access to more flexible and more technology-driven educational opportunities. This demand for flexibility has led to the rapid expansion in the field of online teaching and learning. As online instruction moves out of its infancy, models of teaching and learning specifically tailored to this new technology-enhanced environment continue to evolve. While early efforts involved conversion of existing instruction and design models, recent additions have moved beyond the traditional and have begun pushing the known limits in order to fill this new instructional space and fulfill its promise and potential.

Flexible format programs for adults must be designed to employ a variety of technologies and a range of instructional techniques to engage students, leverage their intrinsic motivation, and empower them with ownership in the learning process. These programs should provide a thriving, diverse, and instructionally fertile context. Many adults, however, struggle to prosper in this dynamic and atypical learning environment.

Disparities of technical competence, motivation, and expectations for learning environments, along with inauthentic interaction and loss of sense of community has left many adult learners unable to cope with new learning paradigms. Recent research has indicated that ambiguity tolerance may play a crucial role in the self-actualization of adult learners. Equipped with a high level of ambiguity tolerance, these learners can thrive in a multi-mode differentiated instruction learning environment, take full ownership of their learning experience, and fully reap the rewards of lifelong learning.

The Study

The purpose of this study is to serve as a pilot study to assess the feasibility of a broader research effort addressing the effect of meta-instruction in ameliorating ambiguity intolerance in the adult learner in selected innovative learning environments. This preliminary iteration will explore the usefulness of a currently available and generally accepted ambiguity tolerance measure, and illuminate a variety of validity threats to the study as a whole.

Context

Valley City State University (VCSU) is a small Midwestern public institution that offers several undergraduate and graduate programs in a fully online mode. Long regarded as a leading provider of technology-infused learning, the Mission and Vision of VCSU outline a commitment to the delivery of a quality educational experience in an innovative, culturally aware, and technology enhanced environment. North Dakota State University (NDSU) is the largest of the state's eleven campuses. The NDSU Education Doctorate program delivers courses using the Interactive Video Network (IVN) supported by a variety of computer-based collaboration tools. Faced with demographic realities of North Dakota as well as a growing demand for flexible and technology-

driven educational opportunities, these institutions will continue to experience an increasing reliance on technology-based instruction for adults.

Brief Summary of Literature Findings

The concept of ambiguity intolerance in the adult learner can be traced back at least as far as Knowles' concept of andragogy. Although it is not explicitly named ambiguity intolerance, Knowles' assumption that adults need to know why they need to learn something (1970) clearly illustrates a requirement for certainty in the learning endeavor. While the literature has been relatively silent on the specific topic of adult learners' ambiguity tolerance in technology-infused learning environments, a great deal of foundational work has been done on a number of related concepts and topics.

Emergent theories such as EduPunk have re-imagined the learning context, outlining a do-it-yourself approach to teaching embraced by tech savvy faculty that eschews the pre-defined limitations of the Learning Management System environment. Unfortunately, faculty who endeavor to embrace this new paradigm and redefine the virtual classroom to integrate principles of andragogy and learner-centered instruction into their courses are often met with resistance from a variety of constituencies, including ambiguity-intolerant learners.

The ubiquity of technology across the curriculum has left many nontraditional learners, Prensky's Digital Immigrants, struggling to find a niche that serves their unique instructional needs. As Digital Immigrants learn to adapt to their environment they always retain, to some degree, their accent, their foot in the past. (Prensky 2001). Today, most adults conceptualize learning as an instructor-designed and instructor-led endeavor that occurs in classrooms where students learn from the so called sage on the stage. This is the model with which most adults grew up. However, many adults want to take advantage of online learning environments, primarily due to their busy schedules and the online format's convenience. They are using technology with different sets of expectations that are based on their personal histories (Tweedell, 2000).

Ambiguity tolerance refers to the way an individual (or group) perceives and processes information about ambiguous situations or stimuli when confronted by an array of unfamiliar, complex, or incongruent clues. Ambiguity tolerance is a variable that is often conceived on an axial scale. The person with low tolerance of ambiguity experiences stress, reacts prematurely, and avoids ambiguous stimuli. At the other extreme of the scale, however, a person with high tolerance for ambiguity perceives ambiguous situations/stimuli as desirable, challenging, and interesting and neither denies nor distorts their complexity or incongruity (Furnham, 1995).

Although tolerance for ambiguity has been highlighted as important in the development of creative, integrative thinking in the college setting, few studies have examined ambiguity tolerance and anxiety in response to uncertainties introduced in the classroom. One effort indicated significant, negative correlations between tolerance for ambiguity scores and ratings of importance of course structure. Results suggest that tolerance for ambiguity may be an important variable to predict student success in unstructured course elements designed to promote critical thinking and parallel the complexities of the applied world (DeRoma, 2003).

Mishra's TPACK model suggests the integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional interplay of three primary forms of knowledge: Content, Pedagogy, and Technology (Mishra & Koehler 2006). While the variety of instructional strategies and technologies available provide limitless flexibility for aligning concepts to be attained with tools that most effectively facilitate learning, these innovative instructional approaches may cause an increased level of discomfort in some students. This marginalization of students can be handled in several ways. Learner Flexibility training involves providing learners with meta-instruction on how to be successful with the corresponding instructional model ensures that content can be covered via the most effective teaching model while broadening students comfort level with educational ambiguity, nurturing the student toward self-actualization (Joyce, 2009).

Sampling Procedures

A combination of convenience and purposeful sampling methods was employed in both the VCSU and NDSU Education programs. Specific courses were selected based upon the instructors' tendencies toward alternative teaching methods, non-conformist online instructional philosophies, and buy-in for the research aims. Overall, the targeted total number of participants for the pilot effort was roughly 50.

Data Collection

In the fall 2009 semester, McLain's (1993) Multiple Stimulus Type Tolerance for Ambiguity Test (MSTAT-1) instrument was used to measure participant ambiguity tolerance levels. A convenience sample of sixty respondents was established by administering the MSTAT-1 instrument in VCSU undergraduate and NDSU graduate courses. Of these, six responses were eliminated due to validity concerns and technology problems, leaving a total N of 54. Roughly two-thirds of the final sample (n=37) were graduate students. Response rates were generally good, easily eclipsing the 80% threshold. Although opportunities for implementation for this pilot study were relatively modest, the high response rate resulted in a reasonable sample size that produced some fairly clear and interesting results.

Findings

When it was introduced, the MSTAT-1 instrument was shown to have a fairly impressive (internal consistency) reliability, as well as significant convergence validity with a variety of existing ambiguity tolerance scales (McLain, 1993). The results of this research effort, however, would seem to indicate that the MSTAT-1 may not be the appropriate instrument to measure how the construct of ambiguity tolerance manifests itself in the adult educational context.

A review of the survey results has suggested a variety of construct validity concerns with the MSTAT-1, which can be organized into three broad categories.

1. Issues concerning the null choice of an odd numbered Likert scale.
2. Dubious survey results from a trial administration to a peer group.
3. Disparity of results regarding ambiguity constructs between the graduate and undergraduate sample.

What is immediately striking in the review of the data is the noticeable deficiency in the neutral selection 4, 'Neither Agree nor Disagree' (fig. 1, below). This conspicuous pattern was clearly evident in over two-thirds of question responses. Some of this pattern can be attributed to differences in the graduate vs. undergraduate responses on particular questions; however, the pattern remains consistent even when only the graduate sample is considered. Note: for all figures in this document, the x-axis legend should be read as Strongly Agree to Strongly Disagree from left to right.

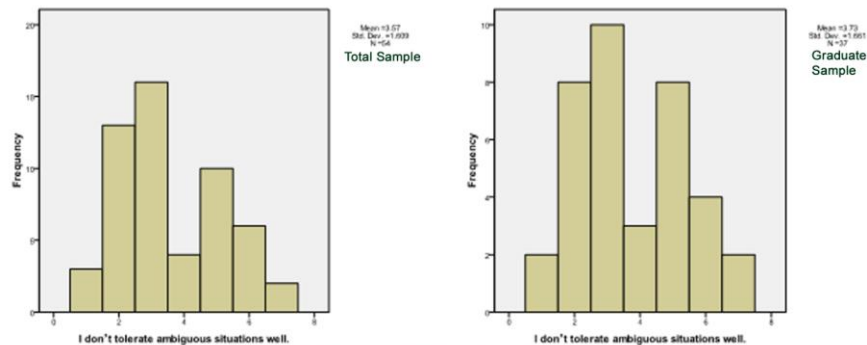


Figure 1: Response Distributions for question #1

While much research has been dedicated to calling into question the validity of a middle (null) choice on a Likert scale, the issue normally exhibited is the respondents' reticence in expressing an opinion resulting in an inflated proportion of neutral responses. In this case, the opposite is true. One could argue that the polarized response data plainly reveals the existence of a distinct opinion of the respondents about ambiguity, either positive or negative. Clearly, the issue of ambiguity tolerance is an important one for learners.

What remains unclear, however, is the relationship between questions that exhibit the pattern, and those that do not. For example, does the relatively high neutral response to questions such as #20 "I prefer problem situations which are so complex some people call them 'mind boggling'" reflect respondents' uncertainty or confusion in the proper response? An examination of questions that failed to engender the same opinionated response as most of the others has not thus far revealed any correlations in regard to question topics or subject matter.

An initial trial administration of the survey generated results that are both counter-intuitive and puzzling. In short, the results simply did not pass the ‘eye test.’ The initial sample was comprised of a cohort group of the NDSU Education Doctorate program. As peers of the author, these respondents have demonstrated an unmistakable aversion to ambiguity in the educational context over the course of several semesters. In fact, it was the author’s observations of this abject distaste for educational ambiguity that served as catalyst for this research. In the MSTAT-1, however, this initial sample reported themselves as exceedingly tolerant of ambiguity. For example, seven of nine in this sub-sample “Agreed” with question number 12: “I am tolerant of ambiguous situations.”

A significant threat to survey data validity is what the author calls the ‘Ali effect.’ During a television interview, boxer Muhammad Ali once famously responded to Howard Cosell’s assertion that he was “being extremely truculent” with the retort: “Whatever truculent mean, if that’s good, then I’m that.” The effect of respondents’ perception of the value attributed to the character being measured cannot be overlooked. While every effort was made to minimize this effect, it is certainly possible that there was significant “hypothesis guessing” occurring.

When organized into Graduate and Undergraduate categories, however, the data tells a slightly different story. While both samples reported near identical self appraised tolerance of ambiguity (question 12), and confidence in their ability to “manage unpredictable situations” (question 7), several other questions resulted in a distinctly disparate distribution when viewed in terms of the sub populations.

In general, undergrads reported little problem with the concept of ambiguity in the abstract, but were more troubled when presented the idea of performing a task under ambiguous circumstances. Undergrads, it seems, are far more likely to be daunted by the prospect of ambiguity. Questions 10 (fig. 2) and 11 (fig. 3) reveal significantly different reactions to the prospect of tackling an ambiguous problem. Graduate students (which are, by definition, adult learners) reported far greater comfort with “responding to an unexpected event” as posed in question 3 (fig. 4).

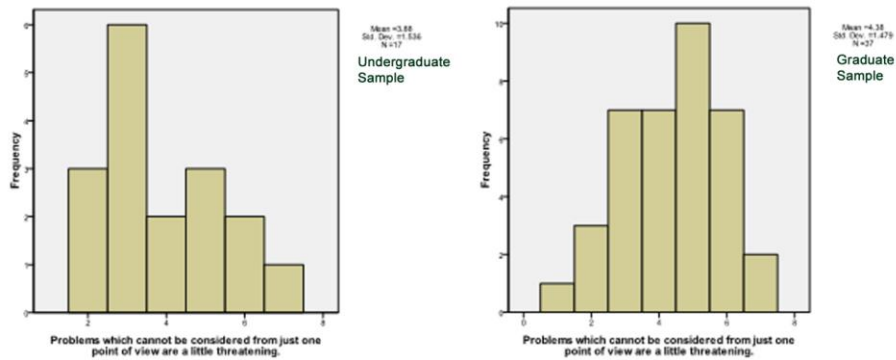


Figure 2: Response Distributions for question #10

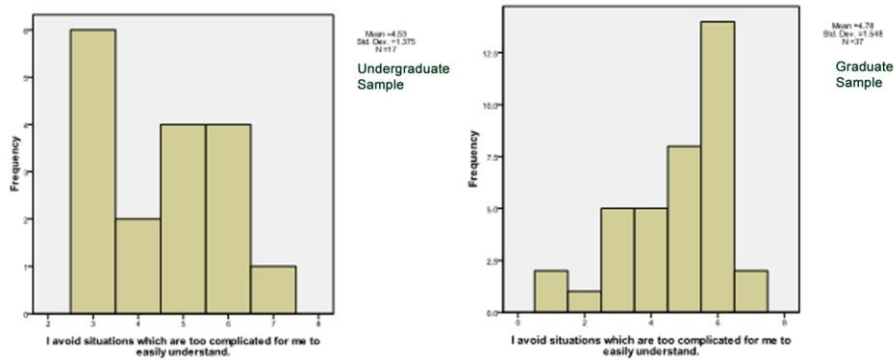


Figure 3: Response Distributions for question #11

The author hypothesizes that the apparent embracing of ambiguity by adults illustrated above is most likely simply a reflection that as an adult, ambiguity is an inherent part of life that cannot be avoided. While undergrads, presumably still in a more adventurous stage of life, might be more likely to seek out an “occasional surprise”

(question 21), they display a clear trepidation to functioning in ambiguous situations. On the other hand, a lifetime of experience dealing with ambiguity and its effects has apparently led adult learners to overestimate their ambiguity tolerance. This overestimation might explain why the demonstrated attitudes and beliefs of the initial group were not accurately reflected in the survey data.

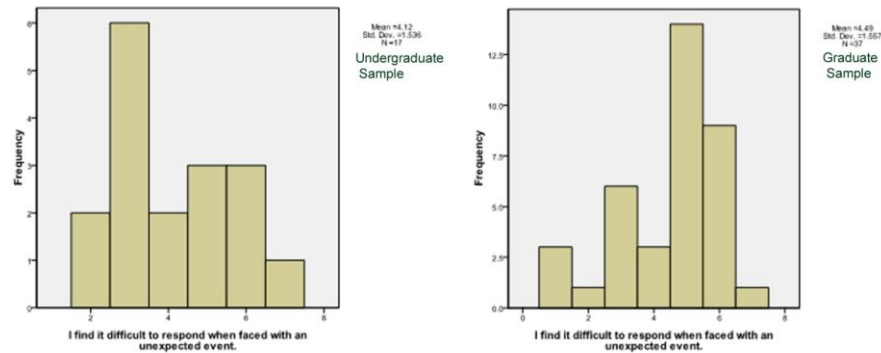


Figure 4: Response Distributions for question #3.

Conclusions

As a pilot study of limited scope and context, it would be imprudent at this point to make any definitive correlative statements about the project outcomes. What is clear, however, is that the results of this effort have alluded to several interesting ideas and opportunities for further research. These include; the apparent importance of the ambiguity tolerance construct in educational contexts, the distinction between conceptual ambiguity and performance ambiguity, and the fact that the MSTAT may not be a valid measure for all populations or all contexts.

While the MSTAT-1 has clearly revealed some interesting data, the overarching results of this project call into question its validity as a measure of ambiguity tolerance in the educational context. Despite efforts taken to minimize the ‘Ali effect’, and assurances that respondents attempted to accurately earnestly represent their attitudes and beliefs, survey result data was largely counter-intuitive and muddled. Unsolicited feedback on the instrument itself included descriptors such as “vague”, “confusing”, and “redundant.” Interestingly, the redundant questions of the instrument offered some of the most persuasive evidence of its shortcomings. Similar questions such as “I don’t tolerate ambiguous situations well” (question 2) and “I dislike Ambiguous Situations” (question 17), resulted in seemingly contradictory response data (unmistakable assent or question 2, acute disagreement for question 17).

As a result of this initial implementation, it is clear that we must turn our focus on revising the MSTAT-1 to be a more valid measure of ambiguity tolerance in the adult education context. Fortunately, the results of this pilot have provided valuable clues as to how to lessen validity threats in the broader research effort.

Next Steps

The overall intent of this research vein is to use the MSTAT-1 (or its successor) in conjunction with a modified version of Swan’s (2008) Community of Inquiry (CoI) model evaluative instrument to attempt to ascertain a correlation between online meta-instruction and adult learners’ ambiguity tolerance for atypical learning environments or activities. Clearly, there is work to be done here first.

The immediate follow-up to this project will involve a qualitative study designed to develop a deeper comprehension of survey responses. Participants will be asked to complete the MSTAT-1 again, accompanied by interviews that will attempt to discover why respondents answered questions the way they did, and how those responses might be altered if survey questions were more focused to the educational context. For example, question number 2 “I find it difficult to respond when faced with an unexpected event”, might be altered to read “I find it difficult to respond when faced with an unexpected change in the requirements of an assignment.”

Without a doubt, it would appear that ambiguity tolerance is a subject that warrants further research efforts. However, we cannot turn our attention the effect this construct has on our selected context until we have developed a valid and reliable measure. This is our next step.

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