Grounding Ethnographic Content Analysis, Etic As Well As Emic Strategies; A Study Of Context For Instructional Designers

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Abstract

Parallels were realized between Krippendorff's (2004) validity evidence for content analysis and Fereday and Muir-Cochrane's (2006) interpretation of Schultz's (1967) postulates for increasing rigor within the examination of social phenomenon. In order to increase empirical validity of content analyses Krippendorff (2004) suggested concentrating on the structure of the analysis, validity of the data, and the relational aspects of the findings. Fereday and Muir-Cochrane introduced a step-by-step analysis process containing deductive and inductive coding, allowing their research to begin grounded and then progress to a thematic, data-driven discovery. Ethnographic Content Analysis (Altheide, 1987) disregards a priori coding as a quantitative characteristic; however, the etic (and emic) quality of the Fereday & Muir-Cochrane methodology adds grounding and structure to ECA without disrupting the discovery, descriptive nature of the methodology. Instructional designers must be familiar with the characteristics and relationships of context when designing for context-based learning environments. No design or analysis models exist that account for the variable relationships of context. ATLAS.ti® provided the capacity, foundation, and modeling to support both etic and emic qualities and validity evidence through an ECA of internet job postings identifying and modeling contextual elements and their relationships.

Keywords

ATLAS.ti, ethnographic content analysis, instructional design, Krippendorf, validity, deductive coding, inductive coding, data driven discovery, context, internet job postings, a prior coding

Introduction

The significant value that teaching in context provides for learning transfer into the work environment is well described by the literature. However, elemental descriptions of context that can be directly used by instructional designers in developing context-based learning environments are not so plentiful. Another drawback to the implementation of context is the lack of analysis methods that instructional designers can easily apply to study particular contexts. As a result, context is often ignored or implemented at a very high level to include only the most obvious environmental values which have only a minor impact on learning and transfer (Figueiredo & Afonso, 2005; Karagiorgi & Symeou, 2005; Tessmer & Richey, 1997).

Research that could define the elements and relationships that constitute context may allow instructional designers to more effectively integrate the models of learning that rely on context, establishing learning environments that are more likely to promote transfer. With only high-level, top-down definitions of context and the desire to discover and examine context from a bottom-up viewpoint, a qualitative study would be likely. The premise that the questions or hypothesizes should drive the methodology of the research were familiar to the researcher; however, a background with positivist influences raised concern with qualities of rigor and validity. The investigative and analytical characteristics of Ethnographic Content Analysis (ECA) to examine current cultural descriptions and discern meaning, context, and theoretical relationships coincided with the intent and objectives of the research. Hansen (2010) describes an ECA

of internet job postings executed to elicit and create a holistic view of industry-related contextual elements and their relationships as well as delineating an analysis approach for future contextual analysis by instructional designers.

ECA was initially disregarded as a viable approach for this research, Krippendorf (2004) described ECA as a methodology that was not clearly defined, validity concerns related to structure and repeatability of the methodology needed to be overcome. Parallels of validity and rigor were realized between Fereday and Muir-Cochrane's (2006) interpretation of Schutz's (1973) postulates for increasing rigor within the examination of social phenomenon and Krippendorff's (2004) validity evidence for content analysis. Echoes of Schutz's principles can be found within the definition of ECA (Altheide, 1996) and methodological similarities were identified between ECA and the description of thematic analysis by Fereday and Muir-Cochrane. Assimilating these commonalities along with the capabilities of ATLAS.ti® to comprehensively manage, evaluate, and model the data permitted a more evidential structure to emerge and provided an analytical framework for examination of industry contexts.

Background

Ethnographic Content Analysis (ECA)

Altheide (1987) introduced ECA in contrast to Quantitative Content Analysis (QCA) emphasizing the similar qualitative characteristics between ethnography and content analysis; specifically, the emergence of meaning from the reflexive nature of both processes, and the close orientation of the researcher to the analysis. ECA and ethnography are both rooted in the discovery of meaning from cultural activities and examine relevance and associations as well as definition from social contexts. Whereas ECA was borne from the examination of television newscasts, the methodology can be applied to all forms of recorded cultural expressions; inclusively defined as "documents".

ECA is focused on discovery, confirmation or extension of theoretical claims, and while not rejective of quantitative considerations, descriptive data is the main outcome. The importance of context, or social situations, and processes surrounding the development of a document was recognized by Altheide in order to capture and relate the whole meaning of documents. Patterned after the reflexive processes of ethnographic fieldwork, ECA demonstrates an emic or inductive approach to analysis where descriptions and themes of social situations and meaning are allowed to emerge from a document without the influence of researcher's assumptions or theories (Lett, 1990). In contrast, an etic or deductive approach would base analysis in existing theory or concepts, the initial constructs of the analysis being defined "a priori" or before the start of the analysis.

A general outline and steps of ECA were defined by Altheide (1996), the intent is to "… be systematic and analytic but not rigid" (p.16). Not uncommon of other qualitative content analysis techniques, the

lack of rigidity in the ECA process is to not disrupt the emic qualities of the examination. ECA also rejects an a priori approach as a qualitative characteristic that would similarly interfere with the emergence and collection of data and like ethnography relies on the researcher's knowledge of the subject matter to provide a foundation for the study (Altheide, 1987). Braun & Clarke (2006) warn that allowing too much flexibility in analysis can negatively impact the focus of the researcher and repeatability of the research by not retaining sufficient details of the method of analysis. Although ECA has produced effective discovery and identification of social meaning, repeatability and structural assertions were of concern due to the openness of the process, minor notes of interpretative evidence, and the absence of associations with informed, theoretical supports.

Validity Structures For Content Analysis

Research that is intended for scientific consideration must sustain the scrutiny of peers based in scientific rules and methods. The interpretative nature of content analyses inherently injects doubt into the results without substantiation from validity supports. Beyond the encompassing face validity, and acceptance of research through social validity, Krippendorff (2004) derived from psychological standards of research three structures that specifically support the *empirical validity* of content analysis. Empirical validity examines research evidence to support that the data collection, research process, and results were based on definable and defendable arguments and that the research could be reliably repeated. In content analysis, the use of various forms of documents require that empirical validity focus on defining and maintaining the *context sensitivity* of the documents; relating the structures of the investigation within the intent and significance of documents under study. Empirical validity for content analyses is supported through evidence from the *content* and *internal structure* of the research, as well as evidence from the results in *relation to other variables*.

Evidence that supports the content structure is comprised of *sample* and *semantic validity*. Within content analysis, semantic validity is an essential evidentiary element of context sensitivity and is concerned with demonstrating that the analytical focus (generally, the categories or codes used in the analysis) coincide with the context and use of documents. Sample validity includes the common research characteristics of sample size and support to the applicability of results. Krippendorff (2004) described unique considerations for the boundaries inside and outside the population of available documents; biases may be reflected in available documents and the effect of these biases could affect the sample size.

The framework of content analyses is defined by the internal structure of the analysis and according to Krippendorff (2004) must provide evidence of *structural* and *functional validity*. Whereas functional validity is determined through repeated, successful use of the *analytical constructs*, structural validity requires evidence from the inferences made between the questions (hypotheses) that drive the investigation and the context or intent of documents. The model or relationships that are the basis of the infer-

ences constitute the analytical construct of the investigation and should be scrutinized for context sensitivity and repeatability, reliability characteristics.

Krippendorff (2004) defined a third empirical validity structure that provides evidence supporting the results of content analyses through *correlative* and *predictive validity*. The similarity in results between a content analysis and another validated inquiry can describe the degree of correlation between the variables and measures used by both investigations. Correlativeness is described as high or low and is measured against variables included as well as excluded in the inquiries. Predictive validity surrounds the ability of the results of content analysis to support future, current, or past observations by upholding existing data about the phenomena. There is an important distinction between these two measures; correlation does not necessarily imply predictiveness.

Without empirical validity there is no evidence that research was conducted under any scrutiny and acceptance is left to the believability of results or face validity. While the outcome of any research is to impact opinion and actions by contributing knowledge and understanding (Somekh, Stronach, Lewin, Nolan, & Stake, 2005), the amount of influence generated by the results of research is directly related to the validity of the research.

A Basis For Rigor

Along similar concerns for rigor and evidentiary results in qualitative research, Fereday and Muir-Cochrane (2006) interpreted Schutz (1967) basis for social research as well as postulates for social research methods (1973) and posited a hybrid process for the thematic analysis of text. Their method of thematic analysis mirrors that of content analysis but included etic as well as emic qualities in which they were able to achieve thematic emergence from documents. The well-structured conceptual framework included an a prior grounding in theory which, at the very least, increased the face validity of their research.

Fereday and Muir-Cochrane (2006) interpreted the postulate of logical consistency (Schutz, 1973) as establishing qualities of rigor and requiring methodological evidence within social research. Incorporating research characteristics of transparency, thorough planning, and maintaining the integrity of phenomenon under study they developed a step-by-step framework that would demonstrate the analysis process and how themes were derived from documents. The resultant framework supports functional validity in terms of repeatability and a means to control the quality and reliability of an investigation. The framework also provides a vehicle for the assessment of semantic validity through the incorporation of a code manual which captures and defines the codes used to examine the documents.

The second postulate of Schutz (1973), subjective interpretation, was explained by Fereday and Muir-Cochrane (2006) as maintaining the participant's subjective point of view in research and delineating the context of the data. Emphasis was given to identifying the interpretive path taken from data to findings. The etic approach of the framework established a code manual of a priori codes based in theory which provided grounding from which interpretations of the data can be explained. The application of these

qualities within the Fereday and Muir-Cochrane framework directly supports structural validity and to a lesser extent semantic validity, focusing on maintaining analyses within the context and intent of the documents under study.

The postulate of adequacy defined by Schutz (1973) was interpreted by Fereday and Muir-Cochrane (2006) as describing qualities associated with the credibility of research, verifying that research findings represent the participant's view. Fereday and Muir-Cochrane suggested the use of member checks, where the researcher's interpretations of data or findings of the research are reviewed and verified with the participants. These credibility characteristics are internal to the research and contribute to validity but they are different measures than the constructs of correlative and predictive validity which are external measures.

Fereday and Muir-Cochrane (2006) produced a qualitative research framework that provides a trail of evidence and focuses on developing useable, repeatable results. The composition of their analysis framework and the validity structures defined by Krippendorff (2004) demonstrated a tight coherence with similar characteristics and criteria of validity. The framework possesses characteristics which support empirical validity and the results of the analysis can be related to the initial grounding of the investigation in theory.

Discussion

Structure And Rigor In ECA

The valuable investigative nature of ECA was overshadowed by the lack of structural supports and validity evidence. A shared recognition for the significance of context to comprehending the meaning of a document was identified between ECA and Krippendorff (2004); further validity structures could not be correlated. However, perhaps through common interpretations of the postulate of subjective interpretation (Schutz, 1973), similarities between ECA as described by Altheide (1996) and thematic analysis described by Fereday and Muir-Cochrane (2006) were recognized. Familiar to both processes is the interpretation and importance of the researcher to the analysis as well as an orientation of constant comparison and discovery of emergent themes in a recursive, reflexive process. Assimilating these two processes revealed further common analysis points which allowed the more structured process of Fereday and Muir-Cochrane to serve as an evidence framework for an ECA.

While the two methods appear very different, there are many similarities within the steps that can be observed (see Figure 1) as well as within the descriptions by the respective authors. Some of the procedural differences are simply the order in which tasks are completed but the tasks themselves have similar accomplishments. The initial three steps in ECA leading to the drafting of a protocol and codes in Step 4 are similar familiarization steps accomplished in creating the code manual in Stage 1 of Fereday

and Muir-Cochrane (2006) method but are not verbosely listed. Stage 4 of the Fereday and Muir-Cochrane method defines coding following a template analysis methodology, this approach is commonly used for transcript data which was the data source for Fereday and Muir-Cochrane's research, but another qualitative approach could be applied. The ECA protocols (codes) are less structured and more open compared to the description of the codes in the Fereday and Muir-Cochrane code manual; although this may appear to remove flexibility from Fereday and Muir-Cochrane framework that is not the case, the application of the codes from the code manual are described with similar flexibility when applied in analysis. Both methods describe analysis as guided by but not limited to the initial codes, as well as describing multiple iterations or recursiveness in analysis steps. Whereas the definitions of the code manual provide certain structural supports and validity evidence, the thicker qualitative summaries of ECA in Step 11, which are the main source of procedural and analytical evidence for ECA, may not produce enough definition of the method of analysis to support validity claims. Qualitative descriptions that depict the emergence of themes and expansion and revision of codes are similarly described and equally expected by both methods.

ECA Steps Described in Altheide (1996)	Thematic Analysis Described in Fereday and Muir-Cochrane (2006)
Step 1. Pursue a specific problem to be investigated	
Step 2. Become familiar with the process and context of the information source…	
Step 3. Become familiar with several (6 to 10) examples of relevant documents, noting particularly the format. Select a unit of analysis (e.g. each article), which may change	
Step 4. List several items or categories (variables) to guide data collection and draft a protocol (data collection sheet)	Stage 1: Developing the code manual
Step 5. Test the protocol by collecting data from several documents.	Stage 2: Testing the reliability of codes
Step 6. Revise the protocol and select several additional cases to further refine the protocol	Stage 3: Summarizing data and identifying initial themes
Step 7. Arrive at a sampling rationale and strategy…	
Step 8. Collect the data, using preset codes, if appropriate, and many descriptive examples…	Stage 4: Applying template of codes and additional coding
Step 9. Perform data analysis, including conceptual refinement and data coding. Read notes and data repeatedly and thoroughly	
Step 10. Compare and contrast "extremes" and "key differences" within each category or item. Make textual notes. Write brief summaries or overviews of data for each category (variable)	Stage 5: Connecting the codes and identifying themes
Step 11. Combine the brief summaries with an example of the typical case as well as the extremes. Illustrate with materials from the protocol(s) for each case. Note surprises and curiosities about these cases and other materials in your data	Stage 6: Corroborating and legitimating coded themes (pp. 4-7)
Step 12. Integrate the findings with your interpretation and key concepts in another draft (pp. 23-24)	

Figure 1: General comparison of document analysis methods

ECA describes a reliance on the data to assist in determining what questions to answer from the data; the emergence and drafting of a protocol in Step 4. Immediate concerns were raised due to the flexibility of this step; possibly allowing the research to wander with multiple interpretations by the researcher, lessening creditability, or by changing the scope or direction of research based on new assumptions which could increase the time and complexity of the research (Krippendorff, 2004). Altheide (1996) does not make an explicit statement but the boundary of the flexibility can be derived from discussion describing Step 8 as having a completed protocol; the protocol should be stable after Step 6 before determining sample size in Step 7. However, without some informed grounding or evidence of the inferences made in relation to the context, the results of ECA may only be considered a view of the data until substantiated by theory (Braun & Clarke, 2006). One could argue that since a protocol of ECA is derived from the data (document) that there could be no closer match to the context. Krippendorff (2004) explained that this

position does not reflect the inquiry of the researcher and leads to a very narrow abstraction of the document which is not supportive of semantic validity. The results of such research could become a possible category for subsequent research but since the protocol is not derived from theory the results cannot be considered to replicate, extend, or refute previous findings (Joffe & Yardley, 2004).

In his efforts to mimic ethnographic field work and distance ECA from the positivist structures of QCA, Altheide (1987) may have rejected minor structural characteristics that could support repeatability and validity. In the etic and emic approach of Fereday and Muir-Cochrane (2006), an a priori development of the code manual did not impart any rigidity to the analysis process but established a foundation and guidance to the analysis. Codes that were defined a priori were allowed to be expanded or change based on testing of the codes (Stage 2) or during the analysis (Stage 4). Beginning with a basis of analysis may pave a quicker path to confirmation or rejection of inferences; a desired quality of analysis processes. Similarly, an informed a priori definition did not inhibit the emic qualities of discovery, themes emerge from the data as both deductive and inductive codes were applied. The definition of ECA processes (Altheide, 1996) allows for pre-defined categories to initially guide the study; the code manual is no different in effect but yet adds value to the research as a grounded evidentiary source to support validity concerns and adds a means to keep the codes, even emergent ones, close to informed sources. The format of the Fereday and Muir-Cochrane code manual contains a code label, definition of the code, and a description of how to recognize when an associated theme occurs for that code. This thorough definition also allows for the code to be related to the context of the document providing support for semantic and structural validity. The development and use of the code manual lends support to functional validity in the form of repeatability and possesses further positive impacts in the areas of inter-coder reliability and training by providing a common definition and coding reference, a common concern of content analysts.

Context Analysis For Instructional Design

The ECA completed by Hansen (2010) integrated the Fereday and Muir-Cochrane (2006) framework in order to achieve evidence of validity. Grounding ECA through an etic approach provided a necessary starting point and guide for an investigation which had high-level theoretical definitions but desired to discover elemental distinctions. The etic approach did not disrupt the emic qualities of the investigation and a rich data set emerged and a model of contextual elements was achieved along with other research objectives. The qualities and investigative characteristics of ECA were applied and were found to develop deep and defining data.

The research questions driving the investigation were defined in conjunction with designing the analysis and defining the data source which adds support to the empirically grounding of the ECA (Krippendorff, 2004). The questions were created to provide direction in eliciting data to build a holistic view of instructional design workplace contexts, the questions to be answered were:

1. What are contexts of the instructional design industry?
2. What are similar characteristics across the identified contexts?
3. What are differences among the identified contexts?
4. How are contexts of instructional design relevant to learning and authentic learning environments? (Hansen, 2010, p. 67)

Altheide (1996) described that the researcher's perspective and knowledge of production processes for the documents under study influences the meaning and significance of the document. The researcher conducting the ECA possessed over 10 years of experience authoring job postings and was aware that job postings were indirect descriptions of the workplace context. The researcher's analysis perspective was based in social constructivist principles where cognitive influences to learning transfer are implemented through authentic environments. These perspectives influenced the selection of the data source and positively added caution to over-interpreting the data (Fereday & Muir-Cochrane, 2006).

Data Source

The focus of the investigation was to capture industry descriptions of workplace contexts and identify and define elements of the contexts so that they could be used by instructional designers in creating context-based learning environments. Most internet job postings contain such ethnographic descriptions which are direct industry descriptions of potential workplaces and represent an abundant and unobtrusive data resource. Whereas the face value of internet job postings as a data source might be low, having a direct point of view of a "participant", albeit indirectly, was considered of greater value.

The basis of semantic validity lies within the ability of the researcher to establish the use and association of the documents under study within a context that resembles their intended use (Krippendorff, 2004). Altheide (1996) discussed similar influences of context but does not require nor suggest any structure within ECA to confirm or validate the context other than researcher's knowledge. The development of the protocol in ECA may reach an association between the context and documents but there is no distinct requirement. Fereday and Muir-Cochrane (2006) acknowledge the importance of context through the interpretation of the postulate of subjective interpretation (Schutz, 1973) but also do not expressly define a structure to do so; however, there are indications that this is achieved through the code manual. Their explanation for the transcript data they used in their research and maintaining the participant's point of view relates the context and document, but there is no discussion of context with data that is not directly developed from participant discussions. The critical influence that semantic validity of content analyses has on empirical validity (Krippendorff, 2004) warranted a close examination and justification of the context of the job postings.

There appears to be an obvious determination that job postings are descriptive of workplace contexts and that the inferences of this investigation are focused on defining that same context. However, Altheide (1996) explained that documents are reflexive of the environment that produces them and meaning could be altered by those who created the document. Therefore, to substantiate this data

source and establish semantic evidence, job postings were scrutinized against the four criterions of natural documents (documents produced for consumption not for research) as described by Ten Have (2004). To use the contents of job postings as information and meaning about industry contexts, job postings were considered authentic, original documents of the companies which produce them; postings contain credible descriptions of the work environment and needs of the company; internet job postings are representative of other types of job descriptions and in many cases, due to the medium, contain more descriptive information than a newspaper job posting; and finally, job posting are meant, intended to provide a description of the work environment. This examination provides a measure of semantic validity but also coincides with Altheide's description of understanding the development process and assessing the meaning of documents within ECA. These assessments also lend minimal support to structural validity; more direct substantiation is gained from the prior validation of internet job postings as descriptions of industry requirements by Byun (2000). The initial concern with face value using internet job postings as a data source was quickly allayed as job postings were found to be a rich source of contextual data to achieve definition and model elements of industry contexts. The shortcomings of job posting as a data source were inconsistent use of terms and misspellings as well as the identified limitation that descriptions would not contain negative views of the context. Any limitations of this data source were far outweighed by the expanse, currency, and availability of the data.

Sample validity within an expansive internet data source was accomplished through a stratified sample which reduced the number of job boards accessed to collect data. A total of 173 job postings (out of 304 downloaded) were coded, achieving a sampling error of at least +/- 10% at a 99% confidence level which was achievable with only 165 samples. While accounting for sample size is not lost in ECA, the placement of this calculation well into the analysis process can appear misplaced considering the amount of analysis completed only to not be able to gain a significant sample size.

Code Manual Development

Development of the code manual started with an emic coding of the literature review that was associated with the research. The 145 quotations from contextual theory and models produced 14 a priori codes that would ground the ECA in contextual theory (see Table 1). Each code was entered into the code manager of ATLAS.ti and the definition and description was included as a comment to the code so that the guidance remained close to the code while coding the data. ATLAS.ti was both the manager and manipulator of data, allowing a single researcher to manage 173 documents, over 5,300 quotations, 42 Primary Document families used to analyze the different contexts, and 134 codes with ease. The time to manually code the 173 job postings would have been significantly greater as coding proved to be very recursive as new codes and themes emerged and as the elements of context were driven into finer detail. Effective use of the ATLAS.ti Code-Coocurrence and Auto Coding tools significantly reduced time expended when codes were added and changes were needed. Without the a priori codes some minor

elements of context, especially those originating from the models of context within the literature review, would not have been recognized or coded as contributors to contextual elements in an inductive, emic review since the relationships between the documents for some elements was very vague and not likely to have emerged. Due to the initial ties to theory and being able to trace each emergent code back to one of the original 14 codes the code manual lends significant support to structural validity. The entire ATLAS.ti Hermeneutic Unit can be considered one big bundle of validity evidence.

Label	Definition
Industry Context	Description of the industry in which work will be accomplished.
Company Goals	Depiction of the realized or un-realized ambitions and direction of the company.
Company Policies	Written, verbal, or implied direction in the operation of the work place.
Physical Context	The arrangement, layout, and space in which work is to be accomplished.
Social Context	Explanation of the personal interchanges and interactions between members of the company; division of labor.
Task	Explanation and elemental aspects of specific work to perform.
Product	The outcome of work and production process.
Production Process	Guidance or description of the transformation of an object into a product utilizing resources of the organization.
Tools	Items noted to be used in support of the production process.
Product Assessment	Quality evaluation of the product.
Knowledge, Skills, and Attitudes	Attributes the applicant must possess to be able to accomplish the work.
Accountability	Responsibilities the worker possesses for the work and product; ownership.
Motivation	Aspects of the work or company that positively affect the worker to increase productivity, quality of product, or quality of the worker.
Coping Strategy	Maintenance of the full spectrum of knowledge gained through education within the work.

Table 1: Initial Codes and Definitions

Coding

The continuous emergence of new codes through Stage 4 of the Fereday and Muir-Cochrane (2006) framework supported the assessment that the literature defined a high-level abstraction of context. Many of the 14 initial codes were graduated to a categorical level as emergent codes were placed under the category, the new code representing a level closer to a contextual element. For example, the initial code of Social Context was quickly realized to have internal and external relationships as well as production and hierarchical interfaces; these were analyzed and coded as finer contextual elements within the social context of the industry. The refinement of the initial codes also demonstrated the excellent starting point that the a priori codes provided as they soon gave way to emergent data. The desired bottom-up view of context was disregarded as a result of the code refinements which revealed that the usefulness of contextual elements is based on the elements effects and relationships to other elements in the context

as a whole. This limits the ability to identify a single element of context without identification of other elements and relationships in the context and the possible cumulative effect from the categories of elements.

Themes, codes, assumptions (recorded in ATLAS.ti memos), all emerged through constant comparison and investigation of the data, described by the analytical orientation of ECA analyses (Altheide, 1996). In an attempt to break down codes which had developed a significant number of quotations (described by *Groundedness* in ATLAS.ti) , the quotations associated with the codes were compared to published International Board of Standards for Training, Performance, and Instruction (ibstpi) instructional design competency descriptions. The comparison allowed for finer elemental definitions, but more significantly the results of the comparison revealed differences in the appraisal of skill levels and other elements between what the industry was requiring and what the competencies had defined. The data was rich enough that notional changes written from the industry perspective (job postings) could be incorporated into the verbiage of the competencies. The importance of researcher familiarity with the subject matter described by Altheide (1996) was realized through this part of the analysis. Discussed in the conclusions of the research the comparison of research results to a peer reviewed model provided some support to functional validity and perhaps, but not calculated, correlative validity.

Interpreting The Data

As contextual elements were identified and coding began to slow, comparisons gave way to associations and clusters of data. Data was grouped according to industry contexts through Primary Document families in ATLAS.ti; 29 unique industry areas or segments were identified Families were not only created to compare and contrast contexts but other emergent themes related to the theory, such as experience, design specialties, and novice verse expert task complexities. These types of families allowed the contextual data to be viewed from many angles and assisted in defining relationships between the elements and contexts. As the families were analyzed by outputting family codes and quotations as well as outputting code counts from ATLAS.ti many observations about the industry and context began to emerge, to capture these emergent observations mini summaries were written, as per ECA Step 10, and minor quantitative analysis was also accomplished so that comparisons could be made and conclusions could be drawn.

The most significant outcome was that the data and ECA allowed a deep enough analysis to theoretically model contextual elements of workplace contexts and their relationships. The network functions of ATLAS.ti allowed the model to take shape by creating sub-models of contextual elements and then incorporating neighbors (codes sharing similar links in the data) until a more complete model took shape. The development of the model also contributed to dismissing a bottom-up view of context as the number of elements identified would have made the model unwieldy (see Figure 2 and Figure 3). The categories established during coding represent the many contextual elements they held and to show their

relationships to other elemental categories; the relationships were defined by the binary relations within the relation editor in ATLAS.ti. A unique relation of contextual elements was recognized and added to the model; Continuous Construction identified elements within the context that continually influenced each other and produced growth in the associated elemental areas (Hansen, 2010). For example, as skills are used to complete a task those skills become more developed and allow more tasks or more complex tasks to be accomplished. The source of this relation originated from Engeström's (1996) discussion of persistent motion and changes within an activity system; activity theory (Engeström, 1987; Jonassen, 2000; Vygotsky, 1978) was major contributing model of context initially coded in the code manual.

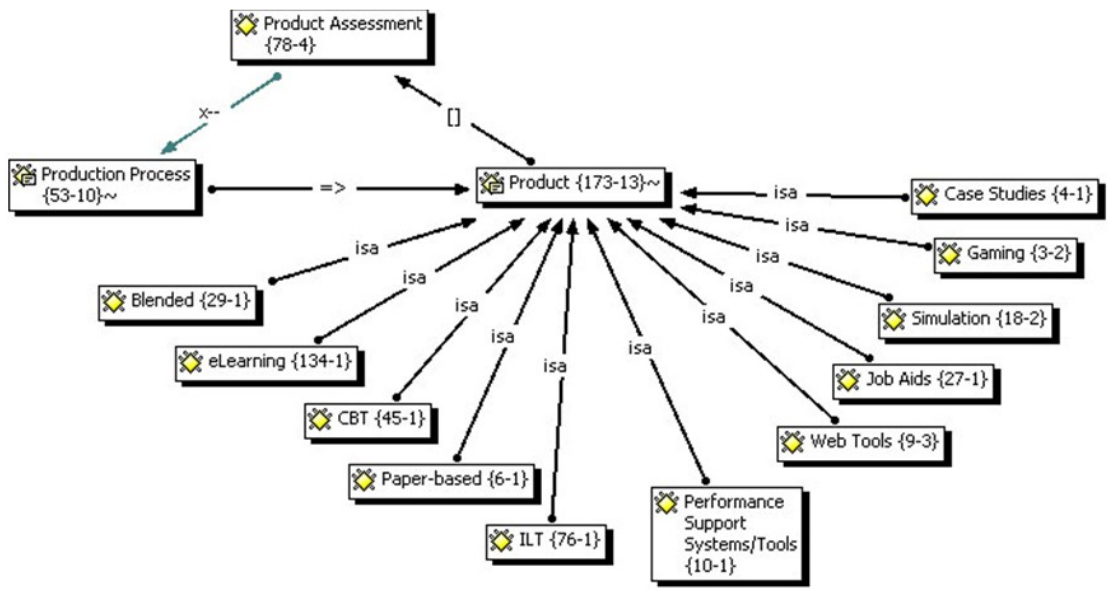

Figure 2: Instructional design Product Network View at contextual element level.

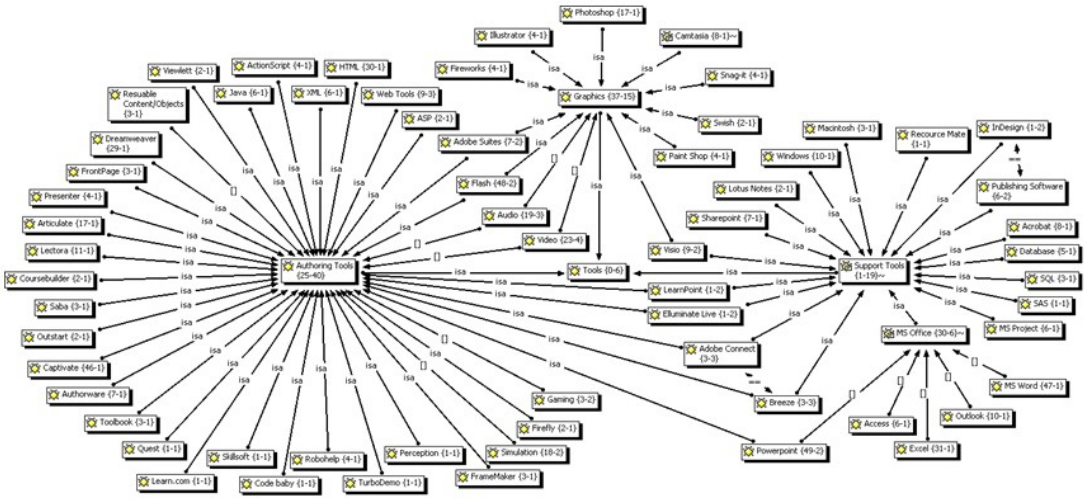

Figure 3: Instructional design Tools Network View at contextual element level.

Conclusion

Tobin and Begley (2004) detailed the literature history surrounding the inclusion of methodological rigor, reliability, validity, and generalization in qualitative inquiry. Whereas there have been staunch rejections of positivist influences on qualitative methods, Tobin and Begley succinctly caution against negating basic principles of scientific research; "… if we reject the concepts of validity and reliability, we reject the concept of rigour. Rejection of rigour undermines acceptance of qualitative research as a systematic process that can contribute to the advancement of knowledge" (p.388). The objectives of research into elements of context were successfully met through the integration of validity and structural supports into ECA. The supports were not overly cumbersome as they did not venture far from processes already accomplished in ECA; for the most part they affected the order of steps and grounded the process in theory. The common ground for the successful integration of validity structures was semantic validity and the maintenance of context sensitivity within the research. The content analysis process used in this research, the expanse and currency of internet job postings as a rich data source, and capabilities of ATLAS.ti to manage and model the data, may provide instructional designers with an analysis process that could prove useful in initial definitions and currency updates to model workplace contexts.

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