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Understanding the Diverse Field of "Educational Technology" as Revealed in Twitter Job Postings: Encoding / Decoding Approach

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Abstract

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Keywords

Stuart Hall, Encoding and Decoding, NVivo, Discourse, Educational Technology

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In this study, we attempt to understand discursive interrelationships among five professional job advertisements which are often used interchangeably, including educational technology, educational design, instructional design, learning design, and instructional systems design. The purpose is to better understand the distinctions, interactions, and overlaps of these disciplines using Encoding/Decoding Model over the discourses of the jobs' announcements. We collected data using a social network analysis tool, NCapture, and imported to qualitative analysis software (i.e., NVivo) to conduct thematic analyses. For this study, 171 job postings in Twitter were captured by using NCapture as a Web-browser extension. Findings indicated that the relations between the targeted disciplines can be explained by Stuart Hall's Communication Model (1980). Results can serve as a guide for scholars and students studying at the intersection of technology and education fields. Keywords: Stuart Hall, Encoding and Decoding, NVivo, Discourse, Educational Technology

Introduction

There is little doubt that learning environments have experienced dramatic changes during the past two decades (Brown & Adler, 2008; Peppler 2013; Scanlon et al., 2013; Sharples et al., 2014). In fact, there are dozens of ways that human learning is changing. For instance, learning is now more open, online, blended, mobile, collaborative, social, video-based, hands-on, ubiquitous, global, game-like, and massive (Bonk, 2009, 2016). Such rapidly increasing and expanding capabilities of learning technology have had a profound impact on the teaching-learning situation (Hlynka & Jacobsen, 2009). Over the past decade, there have been ceaseless attempts to incorporate emerging technologies across all educational sectors from K-12 schools (Adams Becker, Freeman, Giesinger Hall, Cummins, & Yuhnke, 2016; Hardman, 2016) to higher education institutions (Johnson et al., 2016) to corporate, military, and government training organizations (Ravipati, 2016; Robbins, 2016), often with goals related to increasing access to education, adjusting the learning environment to student shifting expectations and experiences, fostering learner engagement and interactivity, and addressing the accelerating costs of education. As in-roads in any of these areas are made, no matter how seemingly modest, it increases the current significance and potential impact of the disciplines at the intersection of learning and technology (e.g., Berrett, 2016; Chang, 2016; Fischer, Hilton, Robinson, & Wiley, 2015; Riter, 2016).

For example, as the delivery of online courses has matured and the technologies to reach and engage students have become increasingly sophisticated, the set of skills required have evolved; in fact, the psychological and design considerations are particularly complex in blended learning environments (Owston, 2017). The vast amount of job openings advertised at the intersection of learning and technology (Kim, 2018) elevates the need to gain a better understanding of the responsibilities for each type of job as well as the associated qualifications expected for each. Current details related to the requisite competencies and job duties is vital

for both those engaged in the recruitment of educational and instructional technologists as well as those searching for such positions. Naturally, it should also be of high value for those in the midst of training or retraining within the field. The skill-related needs and prerequisites that are explicitly stated in the discourses of the advertised positions help to not just frame the current discourses related to specific job openings, but also the current and near future needs as seen in the expectations from such positions.

The present study compares five disciplines including: (1) Educational Technology, (2) Educational Design, (3) Instructional Design, (4) Learning Experience Design, and (5) Instructional Systems Design. Since these terms are often used interchangeably, much confusion and overlap exist in terms of describing the career possibilities to those pondering entering or thinking about entering the field. The purpose of the present study is to explore the interconnectedness and interrelationships of the targeted fields to describe their scope in the job market. By describing the responsibilities and becoming better informed about the qualifications needed in these jobs, the researchers hope that the resulting findings can be useful for both graduate and undergraduate students who plan to pursue a career in one of these five fields as well as to those already employed in these or related areas who are in need of such information for their career enhancement and retooling.

Literature Review

According to Januszewski and Molenda (2008), educational technology is the "study and practice of facilitating learning and enhancing performance by generating, selecting, and controlling appropriate technological processes and resources." However, as various learning technology continues to emerge and evolve, the disciplinary boundaries between the professional fields become blurry (Gibbons, 1997; Hlynka & Jacobsen, 2009). Contrary to the traditional, institutionalized knowledge structures, knowledge is now commonly generated through collaboration and cooperation among those in various disciplines (Klein, 1990). For example, the tasks of the educational technologist are increasingly complex, evolving, and multifaceted (Intentional Futures, 2016). Much of this complexity and multifacetedness has coincided with the rise of online and blended forms of learning (Allen & Seaman, 2013; Bonk & Graham, 2006; Owston, 2017). Add to that the high profile nature of online and blended forms of learning, especially at the time of this writing during COVID-19 pandemic, and it is small wonder why educational technologists are growing in importance in society across all sectors of education (Berrett, 2016; Intentional Futures, 2016; Riter, 2016).

In a similar vein, the field of the instructional design is also considered to have an interdisciplinary nature that is influenced by psychology, communication, and management fields (Ely, 2008). Instructional design refers to "the systematic process of translating principles of learning and instruction into plans for instructional materials and activities" (Smith & Ragan, 1993, p. 2). According to Riter (2016, para. 6), "Great instructional designers must become experts in a near-limitless set of overlapping solutions to produce tractable, informed decisions." However, rapid changes in learning technologies and associated pedagogical opportunities and constraints present marked challenges for instructional designers and others in this field to keep track of; let alone attempt to design and implement the necessary guidelines and training programs to take advantage of them.

With the rapid increase in online and blended learning courses and programs (Allen & Seaman, 2016; Stansbury, 2017), individuals with instructional design and related skills are increasingly sought after; especially in higher education settings (Berrett, 2016). Riter (2016) mentioned that LinkedIn tripled its postings of open instructional designer positions from 2013 to 2016 to somewhere around 15,000; notably, such data does not include related occupations such as learning center directors, technology training personnel, or online learning

technologists. He further noted that CNN Money (2012) anticipates that the field will grow by over 28 percent in just ten years from 217,700 total jobs in 2012 to nearly 280,000 by 2022. Given such trends, there will be a wide array of instructional designer jobs to fill in the coming years. This trend will likely also result in pressing needs for quality assurance personnel, program managers, technology testing and evaluation staff, online and blended learning directors and managers, learning technology consultants, and so on.

There have been recent inroads in this area. For instance, as detailed in the widely cited Intentional Futures (2016) report, funded by the Gates Foundation, instructional designers are diversely trained and qualified. As this report highlights, the requisite skills and duties as well as training requirements for instructional design-related personnel are far from one-size-fits-all. Those employed in this field are called on to help with e-learning, blended learning, self-paced courses, and residential courses, including those that are highly informal, flipped, media rich, mobile-based, and, at times, highly massive as well as various combinations and derivatives of such delivery formats (Bonk, Lee, Reeves, & Reynolds, 2015; Bonk, 2016). According to the International Futures report, the responsibilities of instructional designers include to: (1) design, (2) manage, (3) train, and (4) support. This report argues that instructional designers have become pivotal players in bridging the gaps between traditional instruction and emerging online learning. They also can find balance between instructor-centered forms of instruction and that which is more learner-centered. Equally important, they can grasp the pedagogical needs for interactive and engaging forms of learning and the tools and applications that have emerged during the past decade to address those needs. Nevertheless, the Intentional Futures report notes that many questions remain about what instructional designers do and where they actually fit or are housed in higher education as well as other educational sectors.

A related area to educational technology and instructional design is educational design which is defined as planned and unplanned activities and resources that support learning regardless of whether the learning is intentional or unintentional (AECT, 2004). Nichols and Meuleman (2017) accept "educational designer" as a synonym of "instructional designer" and "learning designer." They also note that situational judgement, problem-solving, and knowledge of instructional design models and technology are the required competencies for an educational designer. Goodyear (2005, p. 82), on the other hand, describes educational design "to be the set of practices involved in constructing representations of how to support learning in particular cases." He prescribes that a detailed educational design act should include design of the learning task, design of the learning environment, and design of the social relationships in the learning setting.

Another recently emerging area, learning experience design (LX Design) is a process of designing the experiences of learners in a learner-centered way to achieve the targeted learning outcomes (Floor, 2018). Hassenzahl (2010) defines "experience" as subjective, holistic, and situated actions, perceptions, motivations, and emotions. It is subjective since the interrelationships among objects, people, and situations produces the experiences. It is holistic since it consists of environmental and individualist factors. Finally, it is situated since all experiences emerge at a place and time. Thus, learning experience designers should consider how a design might influence learners physically, emotionally, intellectually, and culturally (Press & Cooper, 2017). For instance, Schwarzenberg, Navon, Nussbaum, Pérez-Sanagustín, and Caballero (2018) offered a learning experience assessment model in flipped courses. In their proposed model, enjoyment, choice, feedback, challenge, and peer instruction were identified as dimensions of a meaningful learning experience.

Finally, instructional systems design is a science and art of creating detailed specifications for the development, evaluation, and maintenance of situations in which learning and performance are facilitated (Richey, Klein, & Tracey, 2011). Hoadley (2004) has stated

that instructional systems design focuses on "the best ways to create systems that yield learning" (p. 8). He also added that although in the past, this field was concerned with the development of instructional materials, recently it has focused on systems-level factors that impact student learning.

The comprehensive definitions of instructional design have been still reviewed and academically studied. For example, regarding a survey of over 850 people working in higher education institutions in instructional design, course design, or related fields, the Intentional Futures report offers an insightful and quite candid look at the experiences, ages, educational backgrounds, skills, tools, and even the personas needed to be successful as instructional designers (Intentional Futures, 2016). The skills that were reported as useful in that survey varied from project management to strategic planning to research to data analysis to instructional design models to learning new and emerging technologies to graphic design to multimedia production to coding to publishing to teaching and much more. The list is seemingly inexhaustible. The report even offered a glimpse into the barriers to success, possible career paths, professional development opportunities, and typical days of an instructional designer. However, it did not specifically explore the other fields including educational technology, educational design, learning experience design, and instructional systems design. In addition, this report was more practice-focused than research-based. Another problem was that the reliance on survey data has various limitations including validity and reliability issues related to self-report data (Gonyea, 2005).

Considering the above literature related to the fields of educational technology, educational design, instructional design, learning experience design, and instructional systems design; these professions require individuals to analyze, design, and develop learning materials, learning activities, and courses as well as implement, evaluate, improve, and redesign learning experiences. In other words, such people are needed to both encode a message (e.g., course, training, workshop, seminar, etc.) and to decode the message (e.g., implementation, evaluation, refinement or revision, etc.) through a communication channel (e.g., online, blended, face-to-face, videoconferencing, correspondence and other modes of delivery).

Stuart Hall's "Encoding and Decoding" Model as a Lens

As we began to examine the job postings in Twitter for the aforementioned five job fields, we were reminded of Stuart Hall's (1980) meaningful discourse model. As Hall explains, this model deals with "meanings and messages in the form of sign vehicles of a specific kind organized, like any form of communication or language, through the operation of codes with the syntagmatic chain of a discourse" (p. 128). Hall's (1980) encoding and decoding model was an attempt to describe how communication is structured in television messages. For nearly four decades now, it has been highly cited, discussed, and debated by media and culture scholars to understand mediated communication and meaning (Yousman, 2013). According to Hall (1980), encoding refers to constructing messages that may involve encoders' inner thoughts, ideas, feelings, and knowledge. Decoding, on the other hand, refers to turning patterned codes into interpretations. At the core of this communication process, there is communication channel (technical infrastructure) that is used to carry the message. Within the loop of communication, although the producer encodes meaning in a certain way, the audience (decoder) might decode it differently based on the individual knowledge frames and contextual frames

Hall's model consists of the cycling flow of the frames of knowledge in which there are two-sides by which the meaningful discourse is reached with the relations of productions and consumptions of the discourse. In order to theorize the communicative structure, Hall (1980) lists three possible positions of audience to decode any given message. The first is

dominant readings in which the decoded message has the same meaning as it was intended by the encoder. Second is negotiated reading in which the decoder reads the message correctly but not necessarily as intended. Third is the oppositional reading in which the decoder reads the message in a opposite way.

Stuart Hall's encoding/decoding model (see Figure 1) illustrates this by showing the discourses of the meaning of the text between its producer (encoder) and the reader (encoder) (Hall, 1980).

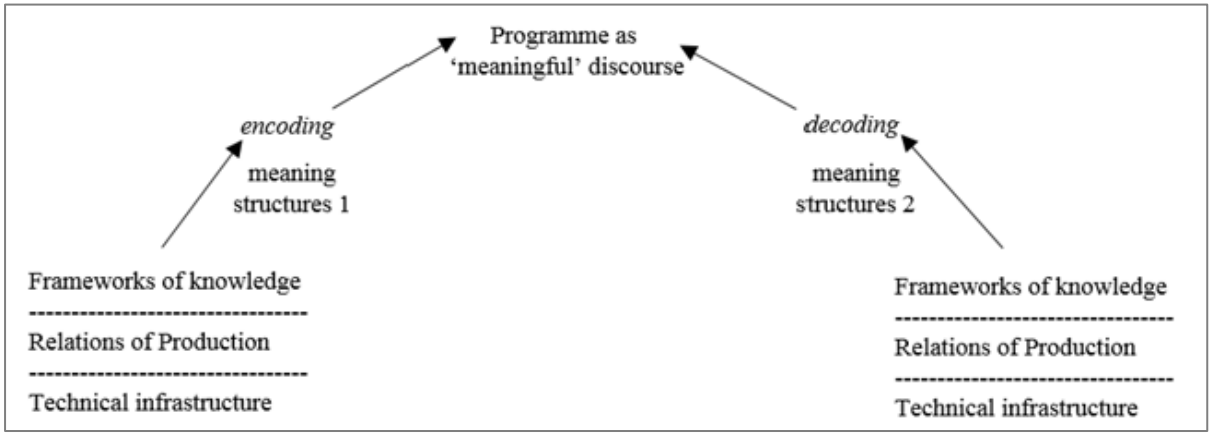

Figure 1: Meaningful Discourse (Hall, 1980)

In this paper, we aim to empirically and analytically discuss the location of the five professions which are often used interchangeably, including: (1) educational technology, (2) educational design, (3) instructional design, (4) learning experience design, and (5) instructional systems design, in the Encoding/Decoding Model. Our purpose is to better understand in which section (e.g., encoding–decoding–channel) of the model these professionals are more widely needed based on the data collected from job advertisements posted in Twitter. This attempt can shed light on the distinctions and overlaps between each discipline.

The following research questions guided current study:

1. What are the interrelationships (e.g., similarities and differences) among the targeted professions based on job descriptions (i.e., educational technology, educational design, instructional design, learning experience design, and instructional systems design)?
2. In which section of the Encoding/Decoding Model are the targeted professions needed based on the job announcements posted in Twitter?

Significance of current study for the authors

Understanding the similarities and differences between these five fields is important for the authors of this study for various reasons. For example, Merve Basdogan is a Ph.D. candidate in the Instructional Systems Technology Department of Indiana University (IU). She has worked in various jobs with different titles such as instructional consultant at IU School of Education, education coordinator at the Continuing Education Center of Middle East Technical University, instructional designer at IU Public Health School, and graduate assistant at the Learning Technologies division of IU. In each position, she had diverse responsibilities and experiences. From her subjective experience, she believes that the major difference among these jobs is the expectations regarding curriculum/program development, technology integration, and assessment. To make her claims stronger, valid, and scientific, she strives to

gleam the big picture by analyzing existing job postings with the hope of capturing the relevant and appropriate patterns and structures.

In a similar vein, Zulfukar Ozdogan is a PhD candidate in the Department of Counseling and Educational Psychology. Zulfukar has been studying in the Inquiry Methodology program with various research interests in foundational philosophy and psychology. Like Merve, he (Zulfukar) got his undergraduate degree from Middle East Technical University, Ankara, Turkey. Courses in political science as well as sociology roused his interests in critical theory and cultural studies. As a result, these interests drove him to study social science methodology, possible constructions of knowledge, the perplexities of subjects' interactions in the field of education, and the needed trust and validations of communicative action in the socialization of individuals. In this study, Zulfukar recreated and revisited his various interests from multiple directions and corners. He defines the text as a medium to carry the information with certain norms and system beliefs. The data of this study pertains to job advertisements in the field of educational and instructional technology. Searching through these job postings let him think about the qualitative methodology that could be used to better understand and represent this data. He began to reflect on how theories from cultural studies and educational and instructional perspectives could be utilized to better understand what it is presented, what it is said, and what it is actually circulated.

Finally, Curt Bonk is Professor of Instructional Systems Technology at Indiana University (IU) with 35 years of experience in the fields of educational technology and educational psychology. As a prominent researcher with hundreds of publications, experienced trainer in online and blended learning at institutions and organizations spanning the globe, and sought after conference speaker in the fields of open, online, and distance learning, he has witnessed firsthand the dramatic unfolding of job opportunities over the past few decades related to online, blended, mobile, virtual, collaborative, and adaptive learning as well as the constantly shifting skill and competency requirements. Professor Bonk is also known for his mentoring of hundreds of graduate students into the field; as a result, it is necessary for him to keep abreast of job openings in the field. In fact, he has designed a master portal of educational technology jobs portals as a means to help young scholars better understand the types of job openings in the field and what they require in terms of a skill-set. The present study will help him promote the field in his international and national presentations as well as help guide students in his own department.

Method

Data sources and data analysis

We started collecting data in February 2018 by using a Web-extension tool called Ncapture. We used job announcements posted in Twitter because Twitter data are circulated daily, freely, and accessibly. First, Twitter data was collected by using the following keywords: "educational technology jobs," "educational design jobs," "instructional design jobs," "learning experience design jobs," and "instructional systems jobs." Job postings containing the keywords mentioned above were derived from both professional organization Twitter accounts and individual Twitter accounts. Next, these data were imported into NVivo (2016) for qualitative content analyses (Rapley, 2008) to answer the primary research question of the study. This analysis was conducted by two researchers in order to ensure the trustworthiness and triangulation of the data (Merriam, 2009.

The dataset (N=431) obtained from Twitter at the end of the four weeks included the following: n=95 tweets for educational technology/technologist jobs; n=36 tweets educational design jobs; n=149 tweets for instructional design jobs; n=109 tweets for learning/experience

design jobs; and n=42 tweets for instructional systems jobs. Among these 431 tweets, 171 of them had a working job announcement link. Therefore, only these 171 job announcements were included in this study.

Second, the connections and interactions among the five targeted professions (i.e., (1) educational technology, (2) educational design, (3) instructional design, (4) learning experience design, and (5) instructional systems design) were examined using thematic analysis. The key goals of this analysis included the development of a coding list, the denoting of categories among the job announcements, and the schematization of the interconnections among the codes. Job announcements, as linked to in Twitter postings, were the communication instrument to mediate this strategy.

The next analytical step was to make sense of the categories of codes by comparing them within the job categories. Codes are the labels that are attached to phrases, expressions, words, and references from the data. Categorizing is, on the other hand, a logical act to organize the coded segments according to their correlations and differences. The aim of this step is to reduce the number of different codes into a list of meaningful groups or themes. A theme is an inquiry act to determine the major and higher categories that emerged from the codes.

To reach an agreement about the labeling of the structural codes that emerged from the analysis of job announcements, two of the researchers regularly discussed the codes and shared their coding system with each other by using NVivo. During the initial analyses and researcher discussions, distinct coding categories were also articulated in terms of the two key research questions. To enhance the credibility of this study, this research attempted to triangulate the sources and methods (Lincoln & Guba, 1985; Merriam, 2009) and engage in prolonged engagement (Yin, 2011).

Findings

Descriptive Content Analysis

The descriptive analysis of the 171 job postings revealed that the number of nodes (codes) in each profession are as follows: (1) educational technology = 38; (2) educational design = 16; (3) instructional design =24; (4) instructional system design = 26; and (5) learning experience design = 27. Among these nodes, Responsibilities, Qualifications, Requirements, Experiences, Ability and Skills, and Preferences are the six nodes having the highest number of references as noted in Table 1.

Table 1. Qualitatively coded nodes and the number of references

Node	The number of references
Responsibilities	37
Qualifications	21
Requirements	18
Experience	13
Ability and Skills	11
Preferences	10

Figure 2 displays the number of node references by the field. The comparison in the chart is based on the number of the words that are used in the coded segments. The matrix information shown in Figure 1 is based on the number of the words and phrases in each job posting documents. Thus, Figure 1 indicates that "General Responsibilities" were repeated more in

Learning Experience Design posts compared to the other fields. Similarly, "Qualifications" were highlighted more in the Instructional Systems Design jobs.

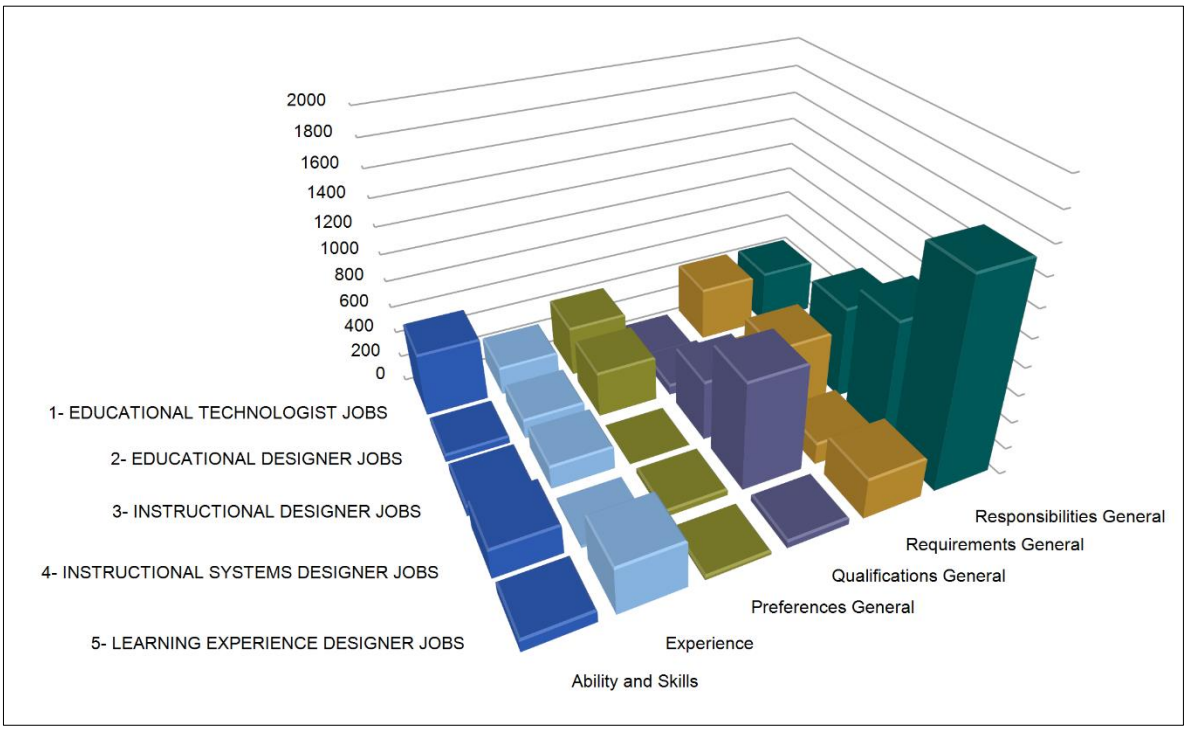

Figure 2. The number of the words in each node references by discipline.

RQ1. In order to answer the first research question: "What are the interrelationships (i.e., similarities and differences) among the targeted professions based on job descriptions…," we identified mutual and negotiated discourse in the job postings for each profession. Drawing from Hall's (1980) Communication Model, mutual discourse refers to the consensus between the fields in terms of the categories of: (1) Ability and Skills; (2) Experience; (3) Preferences, (4) Qualifications; (5) Requirements; and (6) Responsibilities. These six categories were not created by the researchers; instead, these categories directly come from the job announcements. As a result, we do not have operational definitions for each category. Our purpose was to explore their practical and conceptual meanings by coding the relations and frequencies inside of them. Finally, negotiated discourse relates to the unique elements that only one field indicated in the job postings.

Ability and Skills

Given the coding relations with job categories in Figure 3, Educational Technology jobs have a dominant discourse over the ability and skills concept. In other words, from Hall's (1980) topology of encoding position, Educational Technology in that position is powerful to produce the discourses on the definitions of needed skills and abilities used in the job ads. Educational technology was mainly defined by five different skills and abilities; namely learning skills, reasoning skills, organizational skills, business skills, and language ability (see Figure 3). On the other hand, Educational Technology and Instructional Systems Technology positions had a mutual acceptance on the definition of learning skills. In terms of negotiated acceptance, Learning Experience Design emphasized management skills whereas Educational Design sought certain desired skills. Figure 3 shows the relationship graphs of the coded categories for the skills and abilities of the five job categories, whereas Figure 4 provides a

word cloud that depicts the most repeated words for the associated element, with size signaling greater frequency of use.

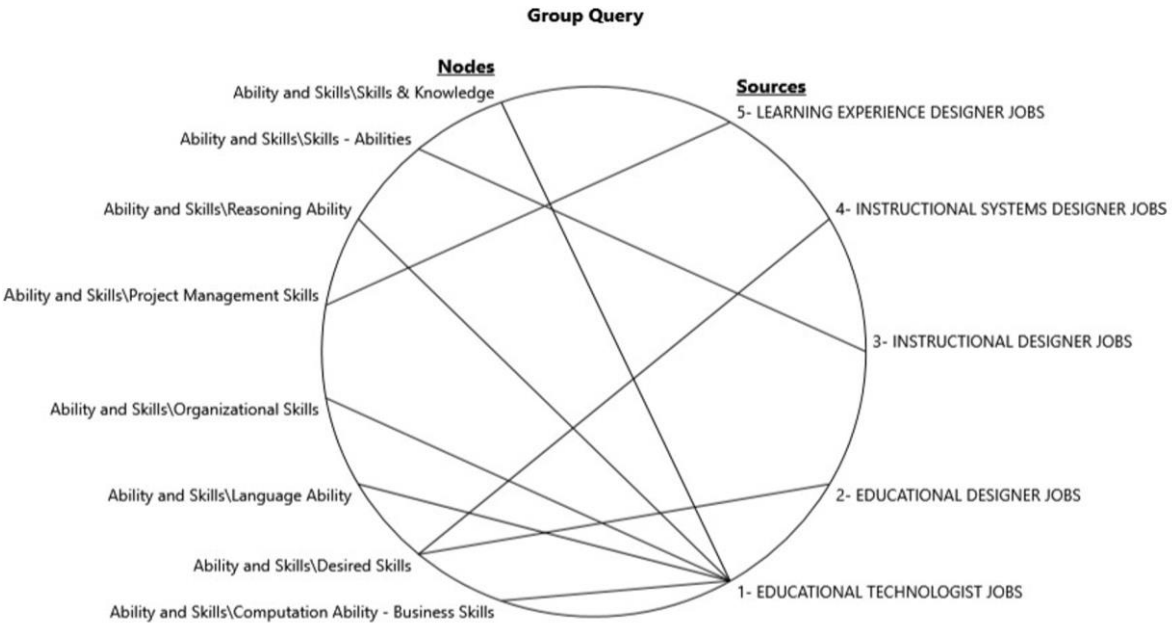

Figure 3. Coding relations of the skills and abilities of the five job categories in Twitter job postings

Figure 4. Word cloud of ability and skills themes of the five job categories in Twitter job postings

Experience

In the experience category, Learning Experience Design dominated the discourse on the work experience such as experience with client-facing, in responsive design for multiple platforms, and direct experience with vendors. In addition, learning experience in designing and developing learning materials and innovative curriculum and certification programming are the other concentration points. In a similar manner, the discourse on Instructional Design

centered on three points: (1) the familiarity with specific software such as Captivate, Storyline, and Adobe Creative Suite as well as Internet and e-mail applications and Learning Management Systems Quality Matters rubrics; (2) required experiences related to design and development of curriculum; and (3) demonstrated experience of adult learning theories and instructional design principles. The findings for Instructional Designer positions, on the other hand, more often had a negotiated acceptance on the number of years in the experience category. Figure 5 details an interrelationship graph on the discourse of fields of the types of experience required for the five job categories, whereas Figure 6 details a word cloud of the word frequency for the experience theme.

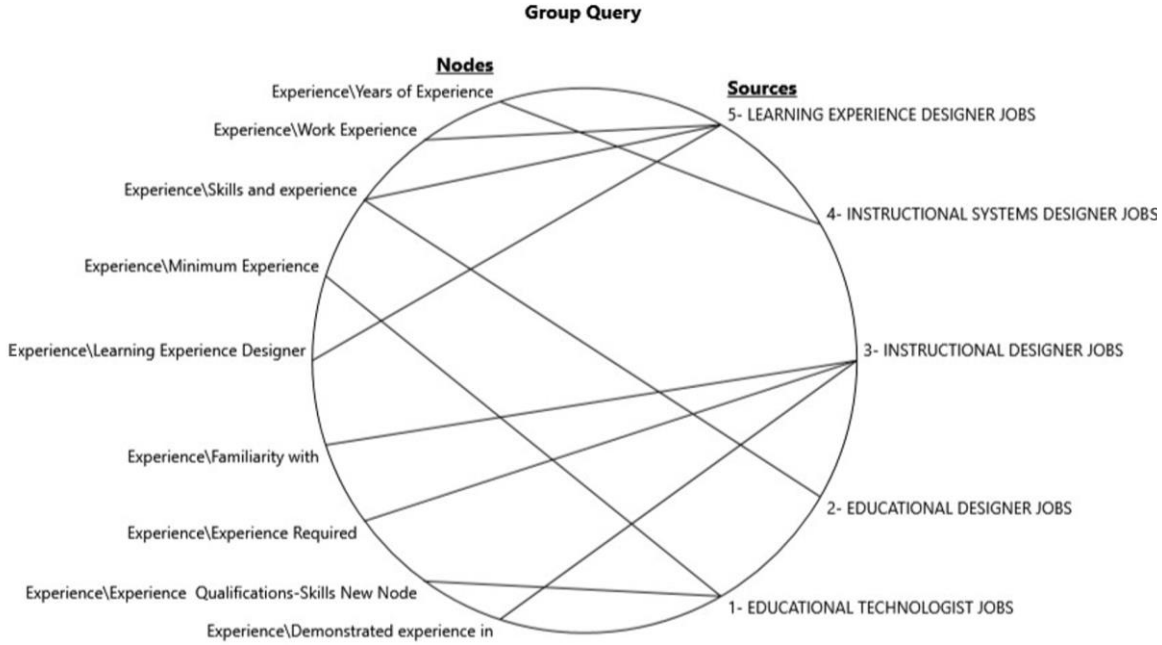

Figure 5. Coding relations of the job categories for the types of experience required for the five job categories in Twitter job postings

Figure 6. Word cloud of experience theme in Twitter job postings

Preferences

In the preferences category, Educational Technology positions were dominated by the discourse on the preferred experiences with Microsoft products, Storyline, and the Agile framework as well as familiarity with flipped learning, visual design, and classroom management. The rest of the jobs had negotiated discourse on the preferred experiences. One of the significant findings in these negotiated categories concerned the "What you will do" section of the Educational Design. Although the others dealt with past experiences of the applicant, educational design positions often provided in-depth descriptions for future activities such as designing online learning, developing multimedia learning modules, and serving as an instructional designer. Such a discourse can be interpreted as the unpredictability of the tasks and the continuously changing demands of the market. Figure 7 shows an interrelationship graph regarding the discourse of fields in the preferences category, whereas Figure 8 details a word cloud of the word frequency for the preferences theme.

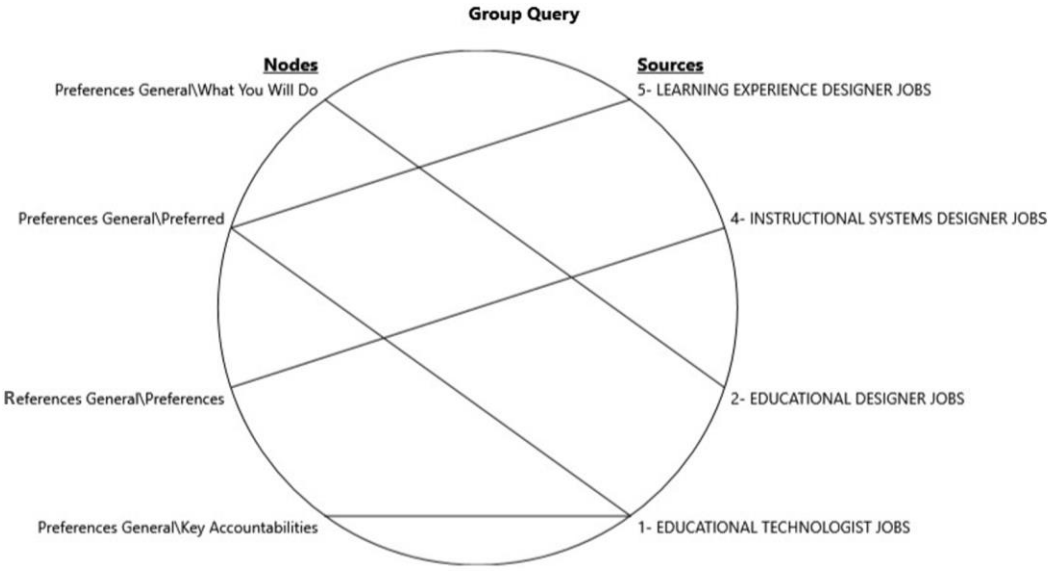

Figure 7. Coding relations of the job categories for the types of preferences required for the five job categories in Twitter job postings

Figure 8. Word cloud of preferences theme in Twitter job postings

Qualifications

Educational Design, Learning Experience Design, Instructional Systems Design, and Instructional Design positions had a mutual understanding on the qualifications. Degree, certification, higher communication skills, and specific years of experience were some of the examples in this category. Instructional Systems Designer, on the other hand, had a negotiated acceptance concerning the minimum number of years' experience expected or required. Figure 9 shows an interrelationship graph on the discourse of fields for job qualifications, whereas Figure 10 details a word cloud of the word frequency for the qualifications theme.

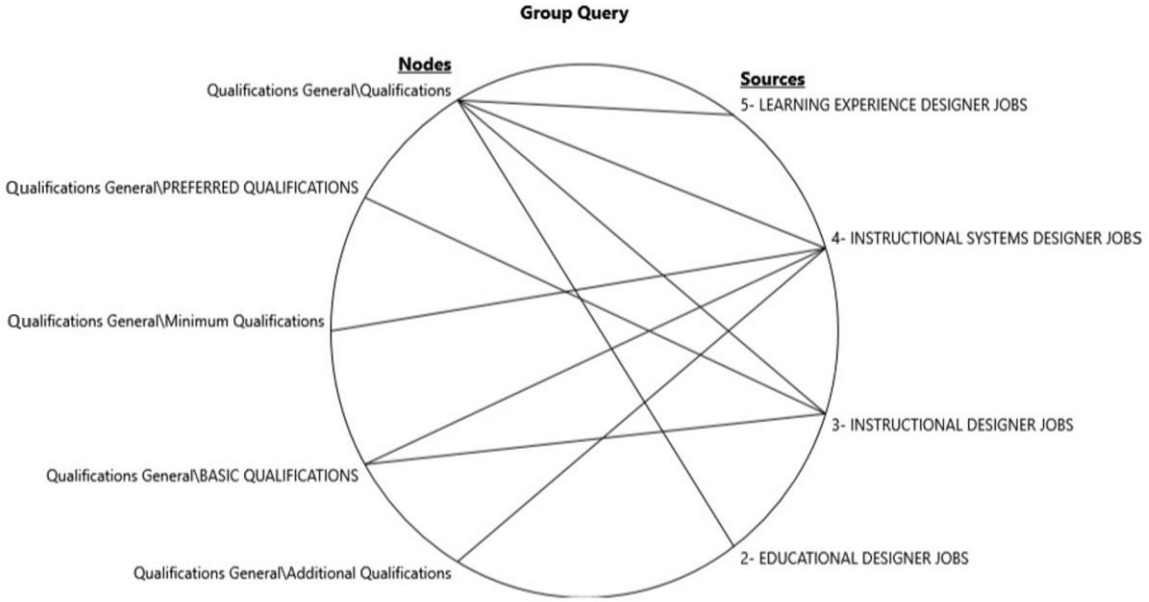

Figure 9. Coding relations of the job categories for the types of qualifications required for the five job categories in Twitter job postings

Figure 10. Word cloud of qualifications theme in Twitter job postings

Requirements

Job postings for Educational Technology, Learning Experience Design, Instructional Systems Design, and Instructional Design had a mutual understanding on the general requirements. Examples include having a degree/certification, knowledge of learning theories and instructional design models, strong communication skills, strong organizational skills, a specific number of years' experience in the field, and experience with specific software. Instructional Design also had a negotiated requirement regarding physical abilities such as constantly performing desk-based computer tasks, and mostly writing digital. Figure 11 presents interrelationship graph on the discourse of fields for general requirements, whereas Figure 12 details a word cloud of the word requirements for the general requirements theme.

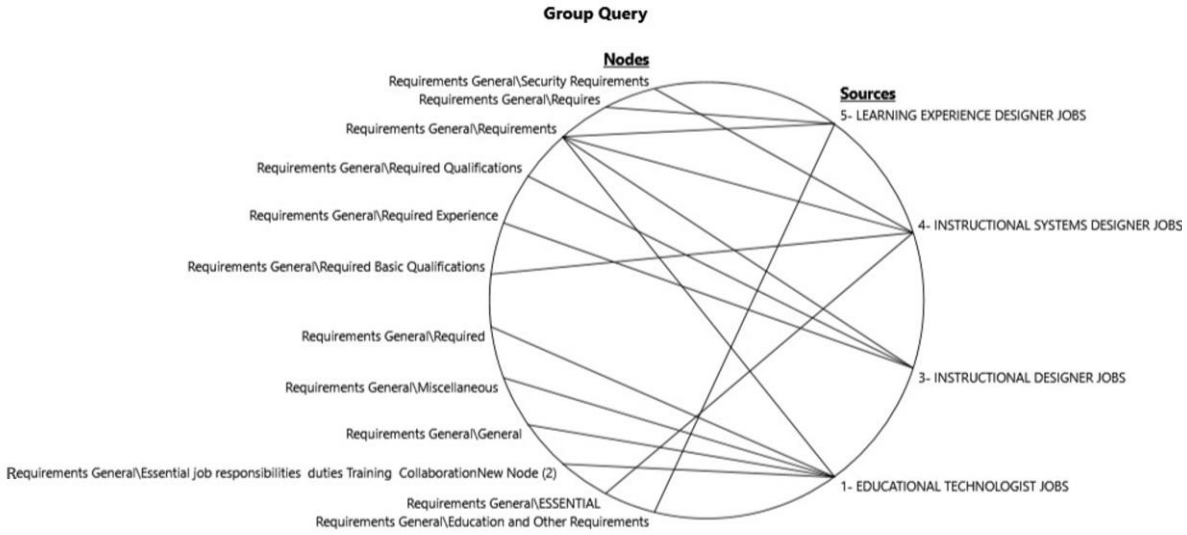

Figure 11. Coding relations of the job categories for the types of requirements required for the five job categories in Twitter job postings

Figure 12. Word cloud of requirements theme in Twitter job postings

Responsibilities

Learning Experience Design, Instructional Systems Design, and Instructional Design related job announcements had a mutual understanding related to the general responsibilities of the position. Examples include the development of training and instruction, conducting evaluation and needs analysis, being familiar with specific software, and supporting learning. Furthermore, Educational Technology positions had a negotiated discourse in stating that "other duties may be assigned." Figure 13 presents an interrelationship graph on the discourse of fields for general job responsibilities, whereas Figure 14 details word cloud of the word requirements for the responsibilities theme.

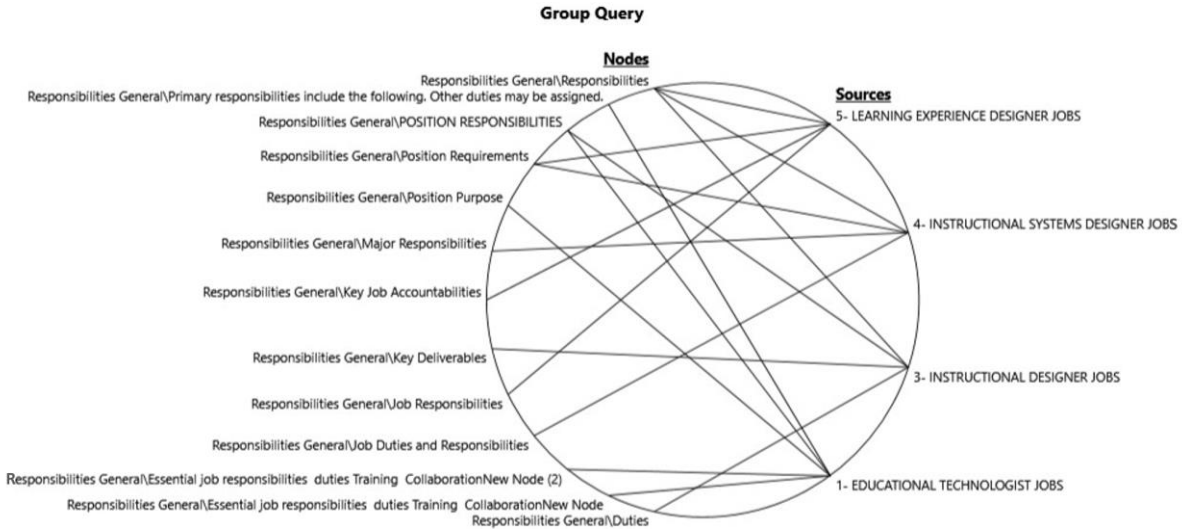

Figure 13. Coding relations of the job categories for the types of responsibilities required for the five job categories in Twitter job postings

Figure 14. Word cloud of responsibilities theme in Twitter job postings

Table 2 summarizes above frequency graphs and shows the mutual codes and discourses of the professions over the categories of ability and skills: experience, preferences, qualifications, requirements, and responsibilities. Check mark (✔) refers to existence of mutual codes in the professions.

Table 2. Mutual codes of the professions over the categories of ability and skills, experience, preferences, qualifications, requirements, and responsibilities

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	Educational Technology (ET)	Educational Design (ED)	Instructional Design (ID)	Instructional Systems Design (ISD)	Learning Experience Design (LXD)
Ability and Skills		✔		✔	
Experience		✔			✔
Preferences	✔				✔
Qualifications		✔	✔	✔	✔
Requirements	✔		✔	✔	✔
Responsibilities			✔	✔	✔

Learning experience design (LXD) has the most mutual codes with other professions. For example, LXD has a consensus on "Responsibilities" with the instructional design (ID) and instructional systems design (ISD).These three professions, LXD, ID, and ISD, also have two other areas of consensus which are "Qualifications" and "Requirements" Next, Educational Technology (ET) has the least consensus with other fields. It has the most consensus with ID, ISD, and LXD on the "Requirements" category.

RQ2. To answer the second research question "In which section of the Encoding/Decoding Model are the targeted professions needed based on the job announcements posted in Twitter?," we have critically examined the content of the each six categories, discussed earlier, for each profession to capture potential patterns and divergencies between the job fields. This analysis indicated to three highly emphasized conceptual themes in the job postings: (1) Knowledge of technology, (2) Knowledge of content development, (3) Knowledge of implementation and evaluation. In Figure15, we located five disciplines based on these three conceptual themes drawing from Hall's Communication Model.

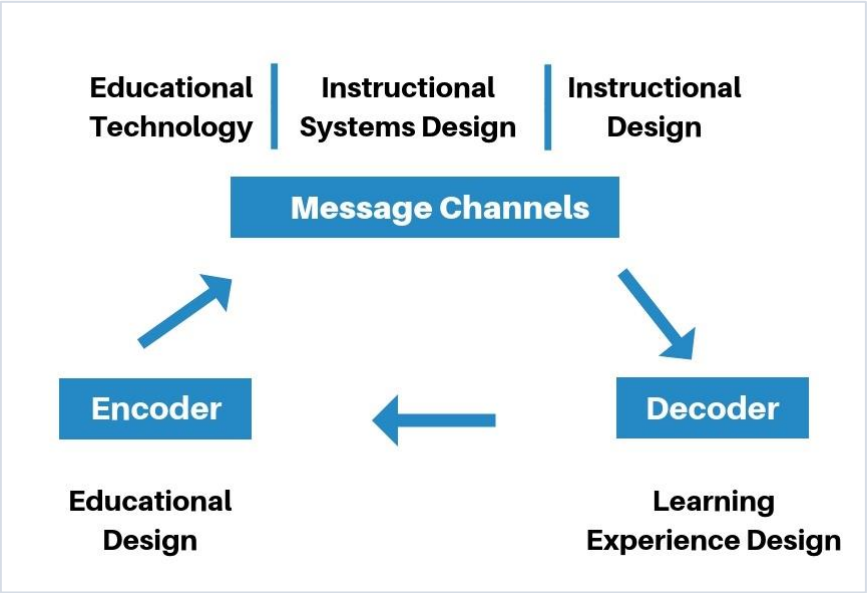

Figure 15. Hall's Communication Model (Adapted and modified for the current study)

First, educational technology, instructional design, and instructional systems design professions are located in the "Communication channel" due to the emphasis on technology knowledge. Educational designer, on the other hand, is located in the "Encoder" section of the model due to the higher focus on the content development knowledge. Finally, we located learner experience designers to the "Decoder" section based on the mutual relations with most of the fields, as found in the RQ1, and prominence of job responsibilities including implementation and evaluation of learning.

Communication channel

According to Hall (1980), communication channel refers to technical infrastructure that carries the message. Delivering the message to its intended audience effectively and efficiently is the main concern of this channel. When we reread the responsibilities, abilities, skills, experiences, and requirements for the educational technology, instructional design, and instructional systems design professions, we found that practical knowledge of technology including software and hardware is highly emphasized in these three job fields as presented in the following excerpts from the job postings with the post number:

> "… maintains a current knowledge of new and emerging technologies and user trends." (Educational Technology, Responsibilities, # 12)

> "… experience with configuration/reconfiguration of hardware, including Windows, Mac and mobile devices" (Educational Technology, Ability, and Skills, # 17)

> "experience with Learning Management and eLearning systems and with production for distance education purposes in an academic setting." (Instructional Design, Experience, #3)

> "Experience with a variety of software tools including, but not limited to Adobe Captivate, Articulate Storyline, MadCap Flare, and WebEx." (Instructional Design, Experience, #9)

> "Experience with Articulate Storyline, TechSmith Camtasia, Adobe Captivate, Audacity, or similar multimedia software." (Instructional Systems Design, Requirement, #25)

> "… must be proficient in Microsoft Office Suite (e.g., Word, Excel, and PowerPoint), Microsoft Project, MS Visio, and Adobe products." (Instructional Systems Design, Qualifications, #10)

Encoding

According to Hall (1980), encoding refers to constructing messages that may involve encoders' inner thoughts, ideas, feelings, and knowledge. The educational designer discipline was located in the encoding section of the model based on the "Responsibilities" provided in the job announcements. The main reason for this decision is the fact that educational designers are predominantly needed for content development. In other words, they encode a message in the form of educational resources, classroom activities, and curriculum materials. The following excerpts show examples from the educational designers' responsibilities:

> "Work with a team of educational designers to develop and revise/update STEM education resources for K-12 students, teachers, and the general public." (Educational Designer, Responsibilities, #4)

> "Develop and write classroom activities/curriculum and supporting resources that are aligned with national standards and, if needed, are customized to meet local needs." (Educational Designer, Responsibilities, #27)

> ".. assist with program design and conceptualization." (Educational Designer, Responsibilities, #30)

Decoding

The learning experience designer discipline was located in the decoding section of the model based on the "Responsibilities" provided in the job announcements. Thematic analysis of the data showed that learning experience designers are predominantly expected to assess the learning and provide learning solutions based on the predefined learning goals. To put it differently, learning experience designers decode the existing instruction and look for possible ways to enhance it. These ways can include the selection of a learning theory or utilization of an effective technology. Therefore, it is not surprising that the learning experience designer discipline has mutual categories with educational technology, instructional design, and instructional systems design professions as presented earlier in the Table 2. The following excerpts show examples from the learning experience designers' responsibilities:

> "Collaborates internally to continuously improve associated content and training modules. Serves as LMS administrator to ensure the content is tested and uploaded correctly." (Learning Experience Design, Responsibilities, #3)

> "Designs and develops learning evaluation tools." (Learning Experience Design, Responsibilities, #19)

> "Develops methods and processes to fine tune training content so it is current, impactful, scalable, and cutting edge." (Learning Experience Design, Responsibilities, #34)

> "Provides product feedback (at key phases) on functional design, feasibility, and usability along with necessary testing pre-launch." (Learning Experience Design, Responsibilities, #56)

Discussion

Based on the thematic analysis, we have found six key interrelationships within the Twitter job posting of the five targeted fields including the following: (1) Ability and Skills; (2) Experience; (3) Preferences, (4) Qualifications; (5) Requirements; and (6) Responsibilities.

The mutual and dominant categories among these six categories suggest that educational technology, instructional design, and instructional systems design professions are mostly needed for recommending, selecting, and utilizing technological tools and processes. They entail the application of strategies and techniques coming from behavioral, cognitive, and constructivist theories to solve instructional problems and to facilitate and evaluate learning through technology under conditions that are purposive and controlled. In other words, they

focus on increasing the efficiency and effectiveness of the tools (i.e., the channel) to carry the message accurately to the learner.

Thus, these three disciplines can be located in the message channels (see Figure 15). According to Hall (1980), a message channel is a medium through which a message is sent or received between people. Hall (1980) argued that when selecting a channel, the availability, suitability, and cost of the channel, type of message that is sent or received, and the communication skills of the sender and receiver(s) are considered. Considering the definitions of these fields in the literature, it not surprising that they fit into the channel section of the Encoding/Decoding Model. For example, as indicated in a 2004 AECT definition, educational technology is a "study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources." Likewise, instructional systems design focuses on "the best ways to create systems that yield learning" (Hoadley, 2004, p. 8) and instructional design is "a technology for the development of learning experiences and environments which promote the acquisition of specific knowledge and skill by students" (Merrill, Drake, Lacy, Pratt, & ID2 Research Group, 1996).

Secondly, as presented in Figure 9, the Educational Design discipline was located at the encoding (sender) section of the Encoding/Decoding model. Educational designers are expected to investigate research methods and apply appropriate learning theory to the design of learning materials and learning events in order to ensure that the desired goals are fulfilled (AECT, 2004). In effect, they plan specific educational events or experiences to transmit certain values, rules, and beliefs (i.e., the messages). Hall (1980) calls these messages as ideology that refers to "images, concepts, and premises which provide the frameworks through which we represent, interpret, understand, and 'make sense' of some aspect of social existence" (Dines & Humez, 2003, p. 89). The thematic analysis of the data supports this claim. It indicates that educational designers are predominantly needed for content development such as classroom activities, training materials, and other educational resources.

The third component of the model is the decoder (receiver) who is an individual or a group of people intended to receive, interpret, or decode the message. For this reason, the learning experience design discipline was located in the receiver section of the model. The definition of the discipline indicates that learning experience design is the practical side of education. In other words, learning experience designers craft the instruction specifically based for the needs of the learners (Walsh, 2017). They accomplish these goals by considering the existing standards as defined by educational designers. Learning experience designers also take into account the tools studied as well as the methods that are proven effective by instructional designers, educational technologists, and instructional system designers.

Conclusion

Study Significance and Future Research

The design of the Encoding/Decoding Model was visionary in dealing with how communication is structured and flows. As the five disciplines of this study continue to grow and evolve, the boundaries between them become blurred and open to misinterpretation and deep confusion (Gibbons, 1997). Consequently, a better understanding of the interrelations among these five disciplines using the Encoding/Decoding Model can serve as a guide for both scholars and students studying somewhere within the intersection of technology and education fields.

The current study is an initial attempt to quantify and correlate existing interactions in five technology-related disciplines by job descriptions posted in Twitter. Such analyses provide one glimpse into the complex responsibilities of those employed in the field of instructional

design and technology (Intentional Futures, 2016) as well as associated fields. Future research might extend this approach to other social media tools (e.g., Facebook, WordPress, and LinkedIn) as well as to those disciplines which also suffer from a high growth-related identity crisis (e.g., computer science, data science and learning analytics, cyber security, etc.).

Next steps might also include ethnographic studies of those employed in this field, including the documentation of the changing skill demands of educational technologists over several years or over a decade or more. Researchers might also more specifically explore the varying skills and competencies that different types of institutions, organizations, and companies might be demanding. In particular, a better grasp of where learning experience designers, instructional designers, educational designers, instructional technologists, instructional systems designers, and others in related fields might find employment—especially in high growth industries or educational sectors—should prove highly valuable to both employers and those currently being trained in the field as well as recent graduates. In effect, such a research report should have enormous societal and personal benefits.

With the opening up of the Web as a platform for formal as well as informal education, the avenues for human learning and instruction continue to proliferate (Bonk, 2009, 2016). As new delivery mechanisms for learning unfold across all sectors of education and training, those designing, delivering, and evaluating or assessing such learning are increasingly in demand. Without a doubt, the job roles and responsibilities will continue to expand and offer employment possibilities during the coming decade for those who today are not even vaguely aware that such fields exist as well as for those already making significant contributions to one or more them.

Over time, fresh models and frameworks will be needed to better understand the job requirements and expectations of those in the field of educational technology and related disciplines. At the same time, innovations in curriculum and credentialing programs in these fields will emerge to assist the tens of thousands of people who will need continued formal and informal preparedness and training to acquire, maintain, and update the skills needed for success as learning experience designers, instructional designers, educational designers, instructional technologists, instructional systems designers, and beyond. For those of us currently in this field, it will certainly be a delight to watch this all unfold in social media job postings as well as in our own courses and programs. Each of us can play a part in this important evolution. Given the extensive societal implications, it is certainly an exciting time to be a participant in any of these five fields as well as related disciplines that are emerging and evolving to fill in the gaps in human knowledge and performance.

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