# Exploring Instructional Designers' Perceptions of Using Augmented Reality

Dissertation Manuscript

Submitted to Northcentral University

School of Education

in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF EDUCATION

by

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San Diego, California

January 2025

## Abstract

The purpose of this qualitative hermeneutic phenomenological study is to explore instructional designers' perceptions of why they are not using augmented reality (AR) as part of their course development practice, addressing a notable gap in the literature that primarily focuses on teachers' experiences. Recognizing AR's potential as a transformative educational tool, the research examines the limited understanding of instructional designers' perspectives. With rapid advancements in mobile and AR technologies, this current study is crucial for understanding why instructional designers may hesitate to incorporate AR into curricula, ultimately impacting educational quality. In this qualitative study, seven instructional designers with at least three years of experience participated in individual interviews and an online focus group. Data analysis using NVivo software revealed two primary themes: perceptions of AR's benefits and barriers to its implementation. Although designers acknowledged AR's ability to enhance student engagement and learning, they encountered challenges such as device usability, limited knowledge of AR technology, logistical issues, financial constraints, and insufficient training time. The findings highlight the need for professional development and institutional support to encourage AR integration. The study concludes with practical implications, including the need for targeted professional development, collaborative AR content creation, technological infrastructure investment, and comprehensive instructional design training programs. Additionally, it recommends future research on AR's impact on student outcomes and practical instructional design frameworks. By addressing these barriers and harnessing enthusiasm for AR, educational institutions can better prepare for its transformative potential in learning environments.

## Table of Contents

# Chapter 3: Research Method

The purpose of this chapter was to describe the design of this study, the research questions, participants and setting, testing instruments, procedures of data collection, and data analysis. The problem addressed in this qualitative hermeneutic phenomenological study was the limited understanding of why instructional designers are not using augmented reality (AR) as part of their course development practice. The purpose of this qualitative hermeneutic phenomenological study was to explore instructional designers' perceptions regarding the factors influencing their reluctance to incorporate AR into course designs. According to current research, studies in the evaluation and investigation of AR have been steadily increasing (Afnan et al., 2021; Maas et al., 2020; Sirohi et al., 2020; Tuli et al., 2021). Even though there is an increase in AR research, many educational institutions do not use augmented reality (Oliveira da Silva et al., 2019). I aimed to examine the acceptance level of AR by instructional designers and their willingness to use it and understand their reluctance to use it as a matter of practice.

## Research Methodology and Design (Nature of the Study)

At the onset of this study, I considered two categories of research methods: empirical qualitative and empirical quantitative. According to Creswell (2013), qualitative uses well-established methodologies such as narrative/descriptive research, phenomenology, grounded theory, ethnography, and case study. Qualitative research explores and understands the meaning individuals attribute to a social, human, or cultural problem.

My study explicitly used a qualitative hermeneutic phenomenological methodology focused on using interviews. Hermeneutic phenomenological research is a methodology for studying the nature and meaning of lived experiences (Alaggia & Wang, 2020; VanLeeuwen et al., 2021). A more detailed description of hermeneutic phenomenology is described further down

in this chapter. Generally, this research design was selected because it uncovers the meaning participants give to their experiences as they recount them. I selected qualitative research for this study because this type of research aimed to contextualize, interpret, and understand the participants' perspectives. Its qualitative characterization of intensive study, description of events, and interpretation of meanings are well-suited for phenomenological studies. Numerous studies apply phenomenological research to educational technology contexts dealing with students' interactions (VanLeeuwen et al., 2021; Vargas-Madriz, 2018; Yu & Watson, 2022). Schunk (1996) discussed how qualitative research is helpful for researchers interested in the perspectives of individuals and when there is a desire to explore new potential causal linkages.

The participants, and not the researchers, are the ones who emphasized the elements of experiences most relevant to them and declared how these experiences had impacted them. My study required that the participants reflect on their past experiences, thus supporting a deeper understanding of their historical involvement or understanding with AR and reinforcing the use of active interviewing. Holstein and Gubrium in Prout et al. (2020) described how active interviewing is the interconnection of the "how" and "what" of mutual experiences between the interviewer and the participants.

In addition to discussing qualitative research, Creswell (2013) also discussed how quantitative incorporates elements such as experiments using random assignments of subjects to treatment conditions under study. He also stated that it could also use less rigorous experiments such as quasi-experimental approaches. Quantitative research is a way of testing objective theories by studying the relationship between variables.

According to Seale et al. (2004), unlike a qualitative study that uses words and focuses on meanings, a quantitative research study uses numbers and is concerned with behavior.

Quantitative research can also generalize, whereas qualitative research cannot. Yilmaz (2021) defined quantitative research as using numerical research data and mathematically-based methods to explain phenomena, and for which its methods and procedures allow researchers to obtain a generalizable set of findings to present them succinctly. Privitera and Ahlgrim-Delzell (2019) mentioned that quantitative research uses scientific methods for recording observations as numerical data. It predicts and produces causal explanations. Findings from quantitative research discover behaviors and trends, but they do not explain why people think, feel, or act in specific ways.

All quantitative research methods considered for this study did not meet the standards necessary for appropriately researching the study's topic—for example, correlational research deals with analyzing relations between variables. As an illustration, Küçük et al. (2014) did correlational research to determine the relationships between attitude, cognitive load, and achievement in learning English using AR applications. Schunk (1996) stated that "…correlation research helps to clarify relations among variables [and its] findings often suggest directions for further research… A limitation of correlational research is that it cannot identify cause and effect" (p.12). The cause sought through this study was the problem of why many instructional designers are not using AR as a matter of practice. Therefore, the application of correlational research did not apply to this study.

All empirical qualitative approaches, except for the hermeneutic phenomenological methodology, also did not meet the necessary criteria for this study. For example, the narrative research methodology uses the experiences expressed in lived and told stories of individuals as data (Flick, 2014). Czarniawska (2004) defined it as the design in which "narrative is understood as a spoken or written text giving an account of an event/action or series of events/actions,

chronologically connected" (p. 17). Using this method, the researcher can gather many different forms of data, such as through interviews, observations, documents, pictures, and other sources. Creswell (2013) discussed how narrative research can be the study of a phenomenon, such as end-of-life emotions, or a study method, such as procedures for analyzing stories. There are many types of narrative research methods that a researcher can implement. The following is a brief list of some narrative approaches used in research (Creswell, 2013):

- Autoethnography. This type of narrative is where study subjects write and record their personal stories.
- Biographical study. A narrative study where the researcher writes and records the experiences of the study subject's life.
- Life history. It is a narrative study where the subjects create stories to make sense of their lives, identities, and experiences.

Unlike a narrative study that reports on the stories of lived experiences of the individual or individuals under study, the phenomenological study focuses on describing what the subjects have in common as they experience a phenomenon (Creswell, 2013). Phenomenological studies focus on exploring a single phenomenon with a group of participants who have experienced the phenomenon. According to Creswell (2013), the group size varies from 3 to 15 participants, and "…the researcher brackets himself or herself out of the study by discussing personal experiences with the phenomenon" (p. 111). The researcher bracketing out does not entirely remove themselves from the study, but having personal experience with the phenomenon can set aside their experiences to focus on the experiences of the study participants. Creswell (2013) also stated that interviewing the participants is typically the data collection method used in phenomenological research.

The two main approaches to phenomenology are hermeneutic and transcendental (Creswell, 2013). According to dictionoary.com, hermeneutics comes from the Greek *hermēneutikós*, meaning interpreting. Van Manen (1990), in Creswell (2013), discussed how hermeneutical phenomenology is research-oriented toward interpreting life (hermeneutical) and lived experiences (phenomenology) (p. 112). Edmund Husserl was a well-known philosopher who significantly influenced known phenomenologists and founded the transcendental phenomenology movement (Eddles-Hirsch, 2015; Gros, 2017). Husserl defined transcendental phenomenology as "bracketing" out the outside world and focusing on the eidetic consciousness. Creswell (2013) discussed how by evoking intuition, imagination, and universal structures, the researcher obtains a picture of the experience.

The design of this study centered on topical questions to maximize understanding of lived AR experiences and participants' perceptions, which points to phenomenological research. The main drive behind this research design was the participants' thoughts, beliefs, and judgments. Van Manen (1990), in Creswell (2013), described the research as oriented toward lived experience (phenomenology) with an interpretation of the participants' lives (hermeneutics). Based on the problem statement and purpose of the study, two research questions supported this qualitative study:

RQ1. What are the perceptions and experiences of instructional designers in incorporating AR into course designs?

RQ2. What barriers, if any, have instructional designers experienced in working with AR?

The hermeneutic phenomenological research methodology, based on the principles of Van Manen (1990), was appropriate for the research topic because it brings forth all the personal

experiences the instructional designers have with the phenomenon explored to coincide with the research questions. The rationale for using a hermeneutic approach made this study viable for understanding the experiences instructional designers have in AR use. The discovery of the experiences and essences of instructional designers' failure to adopt and incorporate AR into their course instruction was essential information for this research.

**Population and Sample**

This study required the participation of instructional designers and practitioners with at least three years of instructional design experience to understand their perceptions of AR and the barriers to its incorporation into instructional design learning instruction. The participants did not need to have designed and implemented AR learning experiences. The selection of experienced participants ensured the homogeneity of the group. To ensure maximum data saturation, I aimed to attain between 8 to 10 participants, with whom I had no prior relationship, for the in-depth individual interview (IDI) and draw 4 to 5 participants from the IDI for the focus group (Onwuegbuzie et al., 2009). However, I could only obtain seven participants for this study, which was sufficient for this study's data saturation. According to Francis et al. (2010), the concept of data saturation does not have a fixed number of participants, and it typically depends on factors such as the research question, the complexity of the topic, the diversity of the population, and the methods of data collection and analysis. Guest et al. (2017) recommended having more than one focus group, but due to different resource constraints, there was only one focus group in this study.

The aim was to pull the necessary number of participants from the Texas Digital Learning Association (TxDLA). I emailed a leading TxDLA organization officer soliciting help procuring participants for this study. I was not allowed direct access to the emails of TxDLA

members; therefore, I had to seek assistance from one of the organization's members. Appendix E contains a copy of the recruitment email.

In case of failure to attain sufficient participants from TxDLA, a secondary plan was to recruit from social media platforms such as LinkedIn and Facebook using a recruitment process developed by Stewart et al. (2020) modified for this study. I did not implement the secondary plan. The process consisted of identifying the sources of potential participants, conducting an outreach by posting advertisements on social media home pages and possibly other moderator's blogs (with permission) explaining the study and requirements (See Appendix A), and creating the list of candidates who manifested an interest in participating in the study. Before the one-on-one interview, I contacted the candidates, provided more specific information, and answered any questions regarding the study process. Finally, to complete the enrollment, I emailed the future participants a consent letter for the future participants' consent (See Appendix D). After enrollment, I asked the participants to participate in a focus group.

LinkedIn is most interesting for recruitment due to the specialized formation of professional groups geared towards instructional designers and augmented reality. Some of the group titles on LinkedIn are Instructional Designers, Instructional Designers and Gamers, Druid Consultants- Instructional Designers, and Ohio Instructional Designers Association. Other groups that have instructional designers and an interest in technology are Immersive Instructional Designers, New Technology Innovations in Teaching, and Using Augmented and Virtual Reality in Corporate L&D. The list is not exhaustive but gives an idea of the immensity of groups on LinkedIn where soliciting participants for this study was possible.

## Materials or Instrumentation

I looked into reliable instruments validated by researchers of studies related to the theories and methodologies selected in this study. A review of the principles of conducting hermeneutic phenomenological research using the instruments guided the development of the interview questions and the analysis process (Alsaigh & Coyne, 2021; Corby et al., 2020; Keshavarz, 2020; Stephenson et al., 2018). The reviewed studies brought reliability to the study's process because other researchers have used similar principles and questions. I supported the findings with data from participant quotations. Through this process, I added another level of validity. I invited subject matter reviewers to review the research questions to validate that the questions aligned with the study's goal.

## Study Procedures

Before conducting this research study, I obtained approval from the National University's Institutional Review Board (IRB) to ensure that the treatment of the participants and the data collected for this study was appropriate, ethical, and secure. The approval included the participants' informed consent authorization form (see Appendix D). The consent form described the focus of this study, the participant's anonymity, and the collected data's security.

The focus group met virtually through Zoom video conferencing software. The research participants had internet connection, camera, and microphone access. In order to have a follow-up analysis of the focus group meeting, I made a video recording of the meeting.

All participants received a brief profile questionnaire before the meetings (focus group or IDI) and were assigned a pseudonym for filing their electronic data. The pseudonym was assigned to aid in preserving the anonymity of the participant. The questionnaire aimed to gather demographic information on the participants:

1. Get a brief profile on the instructional designers
    a. Specialty,
    b. Additional studies,
    c. Years as an instructional designer.

As stated in previous chapters, this study explored the perceptions and experiences of instructional designers about using AR. In addition, the study's results provided beneficial information regarding the acceptance levels of AR by instructional designers and their willingness to use it. Appendix B lists the research questions for the one-on-one interviews and the focus group session that helped understand and fulfill the aim of the study.

I collected data from two sources (interviews and a focus group). The participants filled out the brief profile survey before the one-on-one interviews. Interviews were valuable for gathering systematic information about the participants' feelings, perceptions, and opinions regarding the use of AR. The informality of the setting and the comfort level associated with working through technology led to a higher response rate in this form of data collection. The focus group was an asset for collecting more detailed information about personal experiences, insights, and opinions compared to the one-on-one interviews. However, the possibility existed that participants in the group environment would have been more reluctant to share experiences.

**The Researcher's Role**

The researcher is the primary instrument in a qualitative study (Xu & Storr, 2012; Yoon & Uliassi, 2022). The researchers' responsibility is to collect, analyze, and interpret all data. In this study, I had no relationship with any participants. My philosophical assumptions and interrelationship with the participants were an intricate part of the research. I guided the interviews following the proposed agenda (see Appendix C).

## Data Analysis

In my study, I used two types of data gathering for triangulation. The first type was an in-depth individual interview, and the second was a focus group. Azad et al. (2021) described the IDI interview as the gold standard for understanding human beings and topics of limited knowledge. Santos et al. (2020) and Azad et al. (2021) described IDIs as flexible, allowing individual responsiveness. In the study by Santos et al. (2020), the authors described IDI interviews as a method for allowing spontaneity. In contrast to IDIs, focus groups provide the researcher with data from participants who interactively interchange comments. According to Fry et al. (2021), participants in a focus group can contribute different perspectives on the same topic to the research.

Creswell and Poth (2018) observed that triangulation in several models, data sources, or methods within the research study is a phenomenon. Triangulation involves judiciously reviewing the data collected through different approaches to achieve a more accurate and valid representation of participants' responses. Triangulation requires that the researcher use more than one method to gather data on the same topic so that the validity of the research is assured. As previously mentioned, this research study used interviews and participants from the interviews to form a focus group to achieve maximum saturation, triangulation, and credibility of this qualitative analysis.

I reviewed the recorded data collected from the interviews within 48 hours. I provided each participant with a one- to two-page interview transcript for feedback to ensure that I accurately transcribed the discussion. The correspondence included clarifying questions for the participant's feedback if necessary. I transcribed the audio recordings of the interviews using the

Adobe Speech-to-Text desktop application. As with other AI transcription engines, the transcribed audio was not 100% accurate and had to be manually corrected.

After receiving the feedback, I corrected and codified the transcriptions. The coding process entailed reviewing each line in the transcript multiple times and assigning a code to a word or a string of words related to the thought. Through this coding process, I reviewed each interview transcript in-depth and understood the participants' experiences and perceptions. I used the NVivo program to code keywords and create thematic groupings.

**Assumptions**

For my research study, I took into consideration two assumptions. For the first assumption, I assumed that each participant would act in good faith by responding truthfully and ethically. The second assumption was the belief that all participants possessed basic computer literacy knowledge to follow hyperlinks and input text into textboxes within the basic profile demographic online questionnaire.

**Limitations**

One of the limitations of this research involved sampling. Creswell (2012) stated that a "…researcher selects participants because they are willing and available to be studied" (p. 145), which is convenience sampling; therefore, it is a nonprobabilistic sampling approach. In addition, because of the small sampling size, the results of this study will not be generalizable to the whole population. Another limitation is recalling lived experiences. As time progresses, depending on the participant's interest in the topic, they may not fully recall their experience and convey an experience that did not happen. Therefore, I have no way of verifying the accuracy of their experiences. Even though the participants have experience in instructional design, and I did analyze the data they provided according to quality guidelines reaching maximum saturation, it

was still not enough to provide a completely accurate understanding of the problem. A final limitation is that there is no guarantee that instructional designers who use or have used AR in their instructional designs volunteered to participate in the research study.

**Delimitations**

I chose not to specify any specific AR technology or brand so as not to limit the number of participants. Participation in the study was limited to only instructional designers and practitioners with at least three years of instructional design experience. Including non-experienced instructional designers would not have contributed professional knowledge to the study.

**Ethical Assurances**

I completed the Collaborative Institutional Training Initiative (CITI) program in October 2021 to ensure this research study aligned with high ethical standards. I sought approval from the National University's Institutional Review Board before initiating this study. Additionally, each participant received a consent letter (see Appendix D) stating that they must voluntarily agree to its terms detailing the study's parameters, research methodology, benefits and risks of participation, and their rights and anonymity. The participants were free to withdraw from the research at any time without retribution. The participant's name, IP address, or any other personal information was not collected while collecting the participants' brief profile information. Because of Google Forms' simplicity, I choose it as the program for collecting the participants' brief profile information. The data was stored as a password-protected .xlsx file and backed to a personal flash drive. I secured the flash drive in a locked desk filing drawer at my residence and shall keep it safely secured for three years. At the end of the three years, I will destroy the data by doing a full format on the flash drive.

## Summary

The purpose of this qualitative hermeneutic phenomenological study was to explore instructional designers' perceptions and experiences regarding the factors influencing their reluctance to incorporate AR into course designs. This chapter outlines the methodology and design, population and sample, and the instrumentation for this research. It also presents the operational definitions, study procedures, data collection, analysis, assumptions, limitations, delimitations, and ethical assurances. I identified a recruitment process plan for obtaining volunteer participants and codifying their recorded audio transcripts to aid in producing the study findings.

**Selected Research Exhibit: Data Synthesis**

Table 9 cross-references the themes with previous research in the literature review. The table also cross-references the TPACK categories to which the theme correlates. Since these themes are all barriers to AR acceptance into the classroom, all the TPACK references will be deficiencies. It is essential to know that in its entirety, the TPACK framework provides a solid, successful integration of technology in teaching. The learning efficiency is compromised when one of the framework's components is lacking. Therefore, the cross-referencing to the TPACK framework is included in the table.

**Table 1**

*Cross Reference of Themes with Literature Review Articles and TPACK Framework*

| Theme | Title | Literature Review Articles | TPACK Categories Affected |
|---|---|---|---|
| 2 | Ease of use | Akçayır and Akçayır (2017) | TK |
| 2 | Equal access | Lin et al. (2023)<br>Zilka (2021) | TCK, TPK |
| 2 | Lack of IT structure | Olivera da Silva et al. (2019) | TK, TCK, TPK |
| 2 | Not practical | N/A | PK, TPK, PCK |
| 2 | Technical difficulties | Barroso-Osuna et al. (2019)<br>Derby and Chaparro (2022)<br>Sinlapanuntakul, Korentsides, and Chaparro (2023)<br>Zhang et al. (2024) | TK |
| 2 | Technical skills | Alkhattabi (2017)<br>Ashely-Welbeck & Vlachopoulos, (2020)<br>Njiku (2022) | TK, TPK, TCK |
| 3 | Conception | Kale et al. (2020) | TK, TPK, TCK |
| 3 | Content | Baran et al. (2020)<br>Pathania et al. (2021) | PCK |
| 3 | Curriculum alignment | Njiku (2022) | TPK,TCK |

| Theme | Title | Literature Review Articles | TPACK Categories Affected |
|---|---|---|---|
| 3 | Do not understand the technology | Akçayır and Akçayır (2017)<br>Barroso-Osuna et al. (2019)<br>Garzón, Pavón, and Baldiris (2019)<br>Nikimaleki and Rahimi (2022)<br>Trust et al. (2021) | TK, TPK, TCK |
| 3 | Faculty resistance | Ashely-Welbeck & Vlachopoulos (2020)<br>Belda-Medina & Calvo-Ferrer (2022)<br>Nikimaleki and Rahimi (2022)<br>Sánchez et al. (2019) | TK |
| 3 | Management buy-in | Jang et al. (2021) | TK |
| 4 | Logistics | N/A | TK, TPK, TCK |
| 5 | Budget | N/A | TK, TPK |
| 5 | Building IT structure | Alkhattabi (2017)<br>Barroso-Osuna et al. (2019)<br>Oliveira da Silva et al. (2019) | TK, ICK |
| 5 | Cost | Barroso-Osuna et al. (2019)<br>Huang (2021) | TK, TCK |
| 6 | Challenge getting people to understand the technology | Akçayır and Akçayır (2017)<br>Barroso-Osuna et al. (2019)<br>Fransson et al. (2020)<br>Garzón, Pavón, and Baldiris (2019) | TK |
| 6 | Learning Curve and Professional Development | Lu et al. (2022)<br>Getenet (2020)<br>Huang et al. (2021)<br>Jang et al. (2021)<br>Njiku (2022)<br>Scherer et al. (2020)<br>Sickel (2019)<br>Tusiime et al. (2019) | TK, TPK, TCK |
| 6 | Technical skills | Alkhattabi (2017)<br>Ashely-Welbeck & Vlachopoulos (2020)<br>Dirin (2020) | TK, TPK |
| 6 | Time | Kuznetsova & Sos (2020)<br>Lichtenstein and Phillips (2021)<br>Phillips (2021)<br>Smith et al. (2020) | TK, TPK, TCK |

*Note.* N/A refers to previous research in the lit review referencing the associated theme.