Impact of Augmented Reality Learning Experience Design on Individual and Team Designer Identity

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Instructional designer identity and instructional design (ID) team identity are malleable constructs. Thus, interactions between instructional designers within a design team and inherent immersive technology ID project challenges and successes play a crucial role in identity development. Individual and team identity development happens as individuals take on new roles, critically reflect on past experiences, and engage in open dialogue. The purpose of this post-design project autoethnographic study is to explore the identity development of three novices and one expert

instructional designer as they collaborated on a real-world ID project involving immersive technology. A phenomenological lens will be used to focus on connections made between each team member's lived experiences applying ID principles (i.e., successes, challenges, setbacks, roadblocks, etc.) and the development of individual and team identity. Connections between lived experience and identity development will then be used to explore the reciprocal nature of individual and team identity.

Introduction

The development of instructional designer identity is not an overnight process; it comes when instructional designers devote time and effort towards mastering their craft through continued learning, risk-taking and venturing beyond the rote application of design principles to explore the boundaries of their field. In many respects, instructional designer identity evolves slowly and is built on the reflective practice associated with summative experiences and formative processes (Berzonsky, 1997). Moreover, the development of an instructional designer identity is a personal journey involving accumulating knowledge, experiences, and understanding using cutting-edge technology and advances in educational theories, pedagogy, and methodology. Much of this knowledge falls within the TPACK (technology, pedagogy, and content knowledge) framework describing the knowledge necessary for integrating technology into teaching and learning (Koehler & Mishra, 2009).

ID And Immersive Technology

The expanding field of immersive technology is one area where instructional designers at every experience level are developing new knowledge and understanding of educational theories, pedagogy, and methodology. Immersive technology creates one-of-a-kind learning experiences that merge the physical and digital worlds (Guilbaud et al., 2021) and involves learning experiences where students interact with virtual and augmented reality (Marienko et al., 2020; Pomerantz, 2019). Augmented reality (AR) is one example of the merging of digital and physical worlds, often taking the form of 3-dimensional (3D) objects placed in the student's world using smartphones, iPads, and tablets. As these technologies evolve and digital applications become more advanced, instructional designers must become familiar with their potential in every facet of education—formal and informal, across grade levels, and

industry versus academic. Increases in instructional designer knowledge and understanding of their craft contribute to the development and refinement of their self-constructed identity.

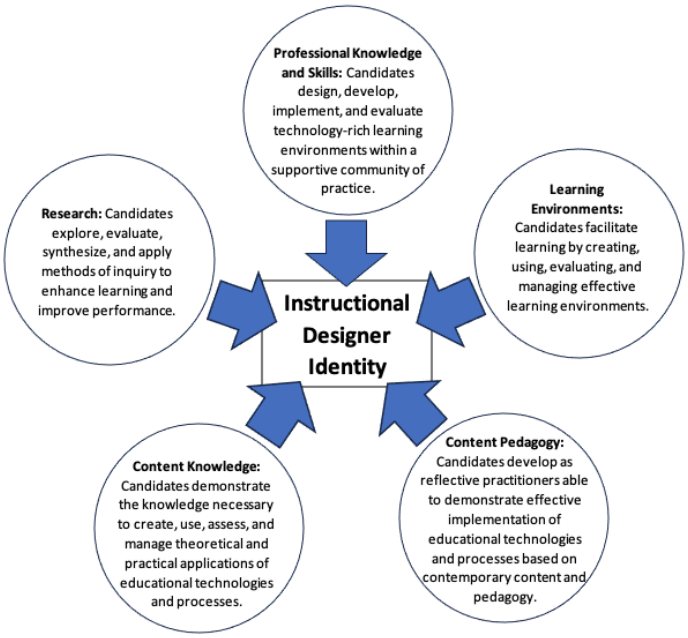
Instructional designer identity is often expressed as value statements about personal experiences (Schwier et al., 2004). For novice instructional designers these personal experiences begin with ID coursework, including projects where they work to integrate newly acquired content knowledge with the application of ID models and theories (Tracey & Hutchinson, 2016). Foundational ID theory (i.e., ADDIE) is built on the notion that novice instructional designers are individuals who will analyze needs, design and develop educational resources, create an implementation strategy, and evaluate project feedback. As instructional designers gain experience by fulfilling ID project responsibilities, expanding their knowledge and increasing their skills/capabilities within the ID field (Kunrath et al., 2020), they progress along the novice–expert continuum and develop a more robust instructional designer identity. Experienced instructional designers will have more developed self-identities resulting from prolonged experience as instructional designers on numerous ID projects (Berzonsky, 1997) and with a variety of technologies and applications. Thus, the authors define instructional designer identity as thinking and being that enhances the epistemological and ontological self-construct of the instructional designer.

Identity Development Through ID Process

Instructional designer identity development necessitates looking at the processes by which instructional designers resolve discrepancies between self-conception and the character traits imposed upon them by standards of professional practice and team dynamics adopted within ID projects (Berzonsky, 1997; Schwier et al., 2004; Tracey & Hutchinson, 2016). Thus, instructional designer identity is shaped by resolving differences between self-conceptions and those placed upon them by industry standards (Figure 1). Exploring instructional designer experience while creating and implementing ID projects involving cutting-edge technology and applications (i.e., immersive learning) will shed light on individual and ID team identity development/evolution.

Figure 1

Graphic Representation of AECT Industry Standards Influences on Instructional Designer Identity Development



A promising focus group for understanding individual instructional designer identity development and ID team identity development is novice instructional designers as they work on real-world projects. Identifying individuals navigating academic coursework and participating in real-world ID projects involving immersive technology can produce rich qualitative data. Furthermore, pairing student efforts with mentor support during real-world ID projects provides an ideal setting for elaborating on the differences and similarities of individual/team identity development and refinement of experienced instructional designer identity (Bishop et al., 2005; Rowland & DiVasto, 2013).

Purpose Statement

This paper discusses how participation in an insect identification ID project influenced the development of individual and team instructional designer identity formation. Focusing on instructional designer identity milestones navigated along the way will illuminate challenges, successes, setbacks, and breakthroughs influential in the development/refinement of individual instructional designer and design team identities. Key experiences of the real-world project involving the creation and implementation of immersive learning using AR content for a science class, including creating AR instructional resources, implementation of the learning strategies, and evaluation of design project instruments and processes will be used to explore pivotal aspects of instructional designer and design team identity development.

Constructing Identity

The foundational precept of ID relies on some individual(s) (i.e., instructional designers) creating educational material. The role of an instructional designer is to systematically, logically, and rationally sequence educational best practices to maximize learning (Rowland,

1993). Kemp (1971) suggests this ID process closely resembles the mental integration of communication theory and educational "machines and materials" (p. 7). Today, much of the ID process involves the instructional designer planning, pacing, and communicating pedagogy and methodology to ensure the accessibility of educational resources (Xie et al., 2021). Thus, each instructional designer begins an ID project with a complex set of "assumptions, constructs, and postulates relevant to" (Berzonsky, 1997, p. 348) how educational resources should be organized to maximize learning.

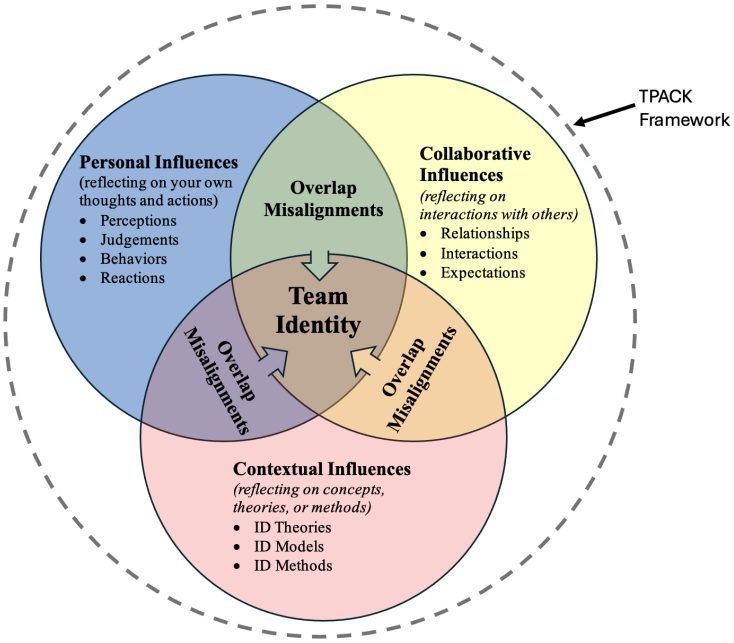
Aspects of Instructional Designer Identity

Razzouk and Shute (2012) suggest that instructional designers understand how their product will impact students, teachers, and the learning environment. Moreover, instructional designers often function as integral members of project teams, collaboratively working to combine a variety of best possible choices to craft solutions for new and novel ID projects (Reigeluth, 1997). Thus, during ID projects involving emerging technology such as AR and other forms of immersive technology, instructional designers play a critical role in communicating technology use, application, and evaluation aspects within team settings and with less knowledgeable clients (Razzouk & Shute, 2012). Exploring design team communication during ID projects involving AR can be used to identify the possibility of misalignment between personal preferences for specific technologies on the part of the instructional designer and real-world impact on students, teachers, and the learning environment. Furthermore, contextual constraints and collaborative efforts with the design team can expose less obvious mismatches between proposed technology and teaching and learning influences.

As instructional designers practice their craft within highly complex and dynamic contexts that are constantly evolving (i.e., immersive technologies such as AR, VR, XR) they are developing greater technological, pedagogical, and content knowledge (TPACK) applications (Koehler & Mishra, 2009). The misalignments between personal, contextual, and collaborative influences during an ID project can be illustrated as personal-contextual, personal-collaborative, and contextual-collaborative influence overlaps taking place within the larger TPACK framework (Figure 2). Koehler and Mishra (2009) state that technology integration within classroom activities is built upon the relationships between content, pedagogy, and the type of technology. As instructional designers develop expertise with new technology and the technology's integration into the design process, their perception of ID and the role of an instructional designer evolves.

Figure 2

Graphic Representation of Team Identity Influences Within TPACK Framework



An instructional designer's identity is grounded in their awareness of teacher-/student-centered paradigms within educational settings (Ersoy, 2021; Reigeluth & Carr-Chellman, 2009; Sims, 2006). Thus, some instructional designers "create and manage an impression acceptable to an audience [while others] likely project and identify with values and standards endorsed by [trusted mentors]" (Berzonsky, 1997, p. 350). It is, therefore, assumed that instructional designer identity includes some awareness of the values and standards associated with the products of an ID project and their perceived impact on teachers and learners. The collaborative nature of most ID projects can result in team dynamics where individuals get mired down in confusion and face challenges within team dynamics that hinder the ID process (Strathman, 2015). In these cases, instructional designer identity plays a crucial role in design team identity as they manage conflicts, navigate changing ID constraints, and create blueprints of roles and responsibilities (Ellis & Abbott, 2012). Thus, ID team identity is defined as the amalgamation of individual instructional designer identities of team members.

Misalignments between personal, contextual, and collaborative influences can be seen as both challenges and opportunities. When ID teams are formed, they must negotiate an understanding of individual roles, navigate changing social groups, and adopt team aptitude and standards. Thus, the establishment of a team identity is one of the earliest team characteristics to be developed within any ID project. It is widely accepted that team identity is as malleable of a trait as individual identity (Fisher, 1997; Liu & Hinds, 2012; Razzouk & Shute, 2012; Xie et al., 2021). Moreover, there is a reciprocal relationship between individual and team identity where team identity is partially defined by individual member identity, and individual identity is partially defined by the team (Fisher, 1997; Litchfield et al., 2018; Rieger & Klarmann, 2022).

It is essential to recognize that roles within ID teams do not function autonomously, as project demands lead to members moving across team roles as they collaboratively work towards a collective set of goals (Litchfield et al., 2018). Moreover, Wenger (1998) suggests that interpersonal interactions within project roles will play a prominent role in developing

instructional designer and design team identity. Successful ID teams find ways to establish members' roles, encourage creativity, promote communication etiquette, and minimize managerial shortcomings (Fisher, 1997; Kunrath et al., 2020; Tracey & Hutchinson, 2016; Tuval et al., 2011). Thus, mentors are crucial in developing behaviors that assist instructional designers as they acquire the knowledge, resources, and support necessary for team success (Litchfield et al., 2018) especially when working with unfamiliar content, applications, and technology.

Study Context

Each new generation of K-12 instructors relies on previous classroom experiences they participated in as learners or resources inherited from trusted mentors (Wilson et al., 2015); perpetuating the use of K-12 instructional materials through successive generations with little to no modification (Ashton, 2014; Shernoff et al., 2017; Shernoff et al., 2020). At the same time, expanding K-12 content necessitates learning material from one educational level must be adapted to different grade levels. Instructional designers specializing in K-12 instruction can be involved in ID projects focused on bringing existing content up to date with the latest technology, methodology, and/or pedagogical practices or finding age-appropriate approaches to evolving K-12 academic standards. Thus, instructional designers working within a K-12 context are tasked with reimagining educational material to refine appropriate levels of difficulty, make resources more accessible to disadvantaged learners (McDaniel & Einstein, 2005), or transition teacher-centric content to more student-centered learning activities (King, 1993).

One near-universal learning experience K-12 life science students are asked to transfer to their everyday experience is applying a dichotomous key for identifying plants and animals. This taxonomy and classification learning activity involves students looking at a 2-dimensional (2D) image of an organism, reading a series of yes/no statements, and then identifying a taxonomic name based on observed physical features. It is believed that novice and expert instructional designers collaboratively working to reimagine traditional dichotomous key classroom instructional resources from 2D images to immersive 3D AR objects will promote the development of instructional designer identity and ID team identity. The following questions will be explored to understand the impact this collaboration has on individual/team identity.

- What impact does collaboration between novice and expert instructional designers during a real-world ID project have on individual instructional designer identity development?
- What are the reciprocal elements of individual instructional designer identity and ID team identity that contribute to individual/team identity development?

The Design Team

One such ID team consists of three novices and one expert instructional designer brought together through a shared interest in examining the use of immersive technology in K-16 learning experiences. Each team member was intrigued by developing and researching extended reality (XR) applications and their potential impact on learning science. The design

team is part of a research group at Purdue University led by Victoria, a full professor in the Learning Design and Technology (LDT) program in Purdue's College of Education. Her research focuses on the development and integration of instructional methods and technologies (e.g., web applications, virtual reality, augmented reality, mixed reality, and artificial intelligence) for collaborative, situated, experiential, and authentic learning experiences.

The novice instructional designers consist of a 17-year K-12 science teacher (Stuart), a 12-year K-12 science teacher (Anthony), and a 10-year K-12 science teacher (Kevin). Stuart's transition from the K-12 classroom to ID work is central to his research interest within applied K-12 integrated STEM as he pursues a PhD in LDT. Anthony's interest in researching immersive learning technology is grounded in his K-12 classroom experience and work as a technology integration specialist and administrator before entering the LDT PhD program. Kevin joined the Curriculum and Instruction MSEd with an Ed Tech Specialization program in hopes of providing his grade 6-8 students with engaging and potent learning experiences and improving instructional practice centered around curiosity and creativity.

The Design Project

Each ID project comes with a unique set of design challenges (Reigeluth, 1997; Reigeluth & Carr-Chellman, 2009; Sims, 2006), and these challenges can be especially vexing for novice designers and/or when working with new forms of educative technology (Ertmer et al., 2009). This AR insect dichotomous key ID project involved both characteristics from the outset: three novice designers collaborating and using the latest AR technology to re-imagine a traditional 2D image-based insect identification learning activity. Challenges team members experienced involved how to design the AR components, use of a foundational ID model from which to approach the design project, implementation strategies, meeting target classroom instructor needs, and project evaluation aspects.

Throughout the ID project, team members identified multiple learning experiences as individuals and as an ID team. There was no shortage of questions about the right way to generate 3D images to be viewed by learners, what classroom instruction involving AR would look like, and how the team would evaluate both the developed instructional resources and student learning.

Methodology

This study is a post-design project phenomenological autoethnographic evaluation of value, worth, and merit with a particular focus on examining these aspects in terms of instructional designer identity development. A phenomenological lens is used to describe the lived experiences (Creswell & Creswell, 2017) of the ID team as they process through successes, challenges, milestones, and setbacks while participating in an AR Dichotomous Key ID project. Creswell and Creswell (2017) indicate this methodology is best for describing "the experiences of several individuals who have all experienced the same phenomenon" (p. 62). Moreover, analyzing and interpreting the design team's lived experience of individual instructional designer identity development to communicate the shared meaning, insights,

values, and issues is indicative of an autoethnography approach to research (Adams et al., 2015).

Connections between personal experience with the ID project and its impact on the development of individual identity as instructional designers and as members of an ID team were made during post-project discussions and data analysis for a separate study. Thus, a retrospective critical reflection approach was taken to collect team members' experiences with identity development. Critical reflection is a valuable tool that assists ID practitioners in improving their practice and aids in formulating meaning from ID experiences (Fook, 2011; Smith, 2011). Fook (2011) suggests that critical reflection provides instructional designers with a means of "unearthing fundamental assumptions" (p. 56) crucial to identity development resulting from professional practice.

Data Collection and Organization

A living document was shared between members with guiding questions (See Appendix A for a list of prompts) for team members to respond to. Initial prompts were created, and team members were encouraged to share their personal experience(s) and draw parallels to the shared experiences and personal journeys of others during the AR ID project. In addition to post-ID project guiding questions, the design team had access to meeting notes. These meeting notes documented decision-making, identification of challenges and roadblocks, and summaries of learning experiences throughout the design project, most of which were collected by Victoria and Kevin, with Anthony and Stuart adding details as needed.

Prompt responses and project documentation were coded using Thomas's (2003) procedure for inductive qualitative data analysis. First, raw data files were cleaned, providing a common format, size, and margins and then organized by prompt (or data recorded in project documentation). Next prompt response and the project documentation were read closely by each team member. As additional information was needed, additional prompts were added for the team members' responses. After individual team members completed coding and analysis, the team met to confirm their agreement and generate a list of agreed-upon themes. Diagrams were created to understand what was emerging and link the reflections to the development and refinement of individual and team identity and misalignments that occurred during the project. The overlapping codes/themes were identified, and non-overlapping themes were evaluated to determine commonality in concept, topic, or impact and added to overlapping themes. Finally, each emerging theme was organized relevant to AECT Standards (2012 Version) as this is the premier professional organization instructional designers are encouraged to join as part of their professional practice (See Appendix B for identified themes and subthemes).

Discussion

Evolving Professional Knowledge and Skills of ID

Exploring AR applications within science contexts while actively engaged in a collaborative team-based ID project contributes to not only emerging individual instructional designer identity but development of an ID team identity as well. There is evidence to suggest that peer collaborative efforts, guided by mentors who are experts in the ID field and knowledgeable of immersive technologies, will support individual instructional designer identity development as they overcome trouble spots in AR applications, establish a community of inquiry, and build expertise.

Examples of each novice designer's morphing perception of what it means to be an instructional designer include Stuart transitioning from seeing ID predominantly as creating instructional material to involving unique evaluation and assessment constraints. Anthony developed a more comprehensive understanding of technology applications within educational settings. Kevin's changing perception of an instructional designer centered on implementation strategies and communication needs. Mentoring throughout the projects helped each novice instructional designer develop a more profound conception of ID principles related to immersive technology and their role in enhancing AR learning experiences. Moreover, each novice instructional designer's identity developed vicariously through the experiences of other team members and along similar lines as the resulting ID team identity.

Team Roles and Identity Development

Wearing many hats is a hallmark of today's fast-paced ID career training, and participation in this project was no exception. Each team member juggled roles associated with educational AR resource development, implementation, evaluation, and project management. For all team members, acceptance of these roles involved managing associated time, research, accessibility, budgetary, and professional development constraints in unique ways. Moreover, each team member played a prominent role in discussions associated with pilot material feedback, which design aspects worked effectively, the classroom setting, and proposed modifications. Anthony's main roles included undergraduate AR implementation strategist and co-developer of lesson materials. Kevin assumed the roles of co-developer of lesson materials, K-12 AR implementations strategist, and intra-team communication facilitator. Stuart was seen as the entomology subject matter expert (SME) and AR insect visual creation co-liaison. Victoria was the ID SME and AR insect visual creation co-liaison in addition to team professor/mentor. Each role became a lodestone around which instructional designer identity developed.

Kevin was the only member of the team who was geographically separated, contributing to his gravitation toward the communication aspects of the project. Furthermore, Kevin used communication and modeling as a means of addressing his perceived skill deficit when comparing himself to other members of the team. Working with lesson material development, ensuring content accessibility, and keeping a record of conversations during team meetings became foundational components of Kevin's developing instructional designer identity.

Anthony found the lack of explicitly defined roles and the flexibility within team roles crucial for grounding him in project goals and objectives. Role flexibility alleviated his concerns about making novice design mistakes, as he allowed others with more expertise in 3D and

AR design to take the lead at different points during the project. Anthony and Stuart found flexibility in roles afforded them the opportunity to reflect on project development from different perspectives and make connections to the concepts and theories they were learning in ID courses. They also learned to navigate conflicts in expectations regarding how ID theories and concepts might be applied to AR projects, one example being implicit principles of multimedia design decisions and considerations despite not being explicitly referenced during team conversations.

Victoria experienced instructional designer identity misalignments in the overlap between her role as a professor and team ID expert and her desire for successful project completion. As with other members, she wanted the project and research to be successful, however, she also wanted novice instructional designers to experience learning and growing through conducting a real-world project and reflecting on successes and challenges. Moreover, although she had ID contextual expertise, other team members (the novice instructional designers) had science subject matter expertise. She found this challenging at times in her role as an ID mentor and recognized the necessity to capitalize on the science subject matter expertise of team members as she navigated her role as a mentor to novice instructional designers. Victoria faced additional challenges as novice instructional designers assumed increased responsibility for tasks, consciously shifting her role to allow them to develop as instructional designers without hindering the learning process.

Critical Reflection and Impact on Identity

Recognizing points during the ID project where prior ID experience did not align with the immediate needs of the AR project became focal points of critical reflection. Each team member experienced successes as well as setbacks, roadblocks, and challenges that afforded them opportunities to reflect on performance and assumptions. One such example can be illustrated when the team was investigating how they could create the beetle AR objects used in the project. Initial plans included the team creating these, however, after some discussion, the team decided to look into hiring a photogrammetry expert. After the photogrammetry SME pointed out the steep learning curve with current applications compounded by beetle imaging challenges, Kevin recognized the need to rethink how beetle AR objects would be generated. He balanced decision-making and the need for the highest quality artifacts based on budgetary constraints and project timing.

Anthony was concerned that AR beetle 3D images created by digital artists would diminish the authentic experience of working with real beetles. Nevertheless, he did recognize that a 3D rendering could be equally effective and focused on advocating for a fully rendered beetle with respect to key identifiable features. On the other hand, Stuart had invested considerable time into developing digital objects, looking into image-capturing technology and software, creating prototype beetles using Tinkercad modeling software, and viewing countless YouTube how-to videos in anticipation of creating an artifact library of insects. The decision to hire out beetle modeling resulted in him questioning team member motivation to create insect models.

Victoria had to reconcile the desire to support team members' interest in creating AR artifacts with developing feasible solutions to project constraints. Finding different creative outlets and moving the project along resulted in each team member eventually turning their

attention to developing other classroom resources that would be used by the teacher(s) and students, resolving personal-contextual influence misalignments. Personal-team influence misalignment was resolved through discussions with others on their shared frustration for being unable to create artifacts due to project completion deadlines. This incident became a common critical reflection lodestone where each novice recognized their perception of what it means to be an instructional designer (and part of a design team) needed to be enlarged.

Disposition and Identity Development

Each team member brought unique dispositions to the project, which not only shaped team dynamics and social exchanges (Lau et al., 2021) but also moderated and influenced work distribution and team collaboration processes (Gray et al., 2015). Chartier (2020) defines ID disposition as inherent attributes demonstrated in how instructional designers apply knowledge and skills when engaged in practical tasks. Such dispositional qualities are integral to the way instructional designers approach projects and are often influenced by social, technological, and cultural factors (Henderson, 1996)

At the onset of the project, Kevin struggled to understand what exactly he needed to do. He saw himself as an experienced science instructor but had significant self-doubt regarding his abilities as an instructional designer. Anthony anticipated taking an active listening role as he explored more of the granular details of the ID process. Stuart saw himself as a worker bee, willing to learn how to use necessary technology, ID software, and apply ID theory and models. Victoria saw herself primarily as an advisor and mentor for other team members. She anticipated encouraging discussions, exploration of interests, and providing suggestions and resources.

Kevin's struggle with finding a suitable role had a profound impact on his instructional designer identity development and is indicative of each member's experience as the project unfolded. Social learning aspects provided team members with a transformational experience as each team member accepted roles and supported other team members. For Kevin, this experience helped him develop new capabilities including becoming the unofficial note-taker for many of the team meetings, alleviating the burden felt by Victoria. Each team member found that as they altered their perceptions of the ID process and their roles as instructional designers, they were afforded opportunities to work one-on-one with Victoria to develop a more comprehensive individual and design team identity.

Limitations Awareness and Identity Development

Each team member entered the project with unique expectations shaped by their understanding of ID. Individually, they anticipated achieving specific goals and acquiring new skills while also envisioning slightly different end products. However, as the project unfolded and intricate details emerged, each member became increasingly aware of their limitations and had to adapt their individual ideas and goals within the realities of the project. As team members cultivated problem-solving skills, adaptability, and flexibility their instructional designer identity morphed.

Anthony envisioned the final product of the project would involve beetles being animated and immersed in their natural environments. However, he soon realized that acquiring the expertise needed within the project's timeframe was impractical and adjusted his expectations, seeking more realistic solutions. Stuart became aware of his limited vision of assessment as a tool to gauge student mastery of course content. As the team started discussing data collection for research purposes, looking beyond whether students were able to recall terms or processes, he began to make deeper connections to not just what students were learning but also how and why they were learning.

Kevin quickly recognized the need to address how and where to store AR artifacts once they were developed. While this did not impact the core project vision, specifics demanded that the team address these considerations earlier rather than later. Determining as many details as possible and asking the right questions was something he found enjoyable and became a favored contribution to the team throughout the project. Supporting team member interests and project goals was very important to Victoria who put considerable effort into finding solutions that were feasible. When the project started, the team did not know what AR technologies would be utilized, how the 3D images would be created, and many other aspects. These all had to be investigated. When suggested ideas didn't pan out, Victoria felt compelled to find new options that would keep the project moving forward successfully. This often involved allowing less experienced team members to take on greater responsibility.

Open-Mindedness, Adaptability, and Communication

Each novice instructional designer expected that conversations and plans around the design of AR resources would lean heavily on various theories they had learned about during coursework, each expecting to reference theories explicitly when making design decisions. However, they found that each had preferred shortcuts to accomplish specific tasks and that these heuristics played an important role in their identity as instructional designers. Communicating preferred heuristics was one crucial aspect of team identity development. As team members remained open-minded to different ways of approaching solutions, they discovered new ways of thinking about and doing ID work.

Moreover, Kevin pointed out that the team had developed a routine of communicating needs and intentions. He noted how each team member would report on their progress and encourage one another through challenges and during disappointments and setbacks. The adaptability of team members was another critical aspect contributing to the team's ability to accomplish much more as a design team. As each member focused on contributions outside their perceived strengths and encouraged one another through their challenges, they met project demands and contributed to the developing team (and individual designer) identity.

Implications for Teams and Individuals

Working with new and emerging technology exposes misalignments between personal-contextual, personal-team, and team-contextual influences. These misalignments can become lodestones around which an instructional designer and ID team identity

develops/modifies. Engaging in ID projects involving immersive technology such as AR during coursework enables novice instructional designers to better understand the ID field, be mentored in generating ID solutions and evaluate competing alternatives to design problems. As team members gravitate toward preferred aspects of ID using immersive technology, they will identify unique challenges. Moreover, individual instructional designers who see themselves as content creators must learn to see the overarching vision and engage in other aspects to ensure the success of the broader project vision. Thus, venturing beyond preferred roles and engaging in aspects of ID constraints outside their comfort zones increases instructional designers' likelihood of developing a more robust instructional designer identity and contributing to the development of the design team's identity.

As ID projects involving immersive technology unfold, ID teams face decisions, hurdles, successes, and setbacks around which individual instructional designer identity and team ID identity development can be traced. Successful ID teams must establish clear communication. The ability to connect through communication enables a team to maintain a steady workflow, focus on common goals, adjust needs, and mentor/support one another through challenges. Communication enables ID teams to coalesce a single team identity comprising individual team member identities. Through open dialogue, each team member can openly infuse their authentic perspectives onto the team and reciprocally be influenced by the thoughts of other team members.

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Appendix A

Prompt #1- What was your initial identity?

Prompt #2 – What was your perceived team member role/mindset at the beginning of the project?

Prompt #3 – What was your initial ID mindset at the beginning of the project?

Prompt #4 – How did you react to evolving specifications and constraints? – Give specific example(s)

Prompt #5 – How did you respond to evolving interpretation of ideas – Give specific example(s).

Prompt #6 – How did your project vision evolve over time? – Give specific example(s).

Prompt #6 Follow-up question – How did thinking toward the formation of assessment tools/processes change over the course of the project? – Give specific example(s).

Prompt #6 Follow-up question – How did you manage competing goals within the team? – Give specific example(s).

Prompt #6 Follow-up question – How did you navigate creative visions as a team and/or member of a team? – Give specific example(s).

Prompt #7 – How did you address communication barriers while working in a design team? – Give specific examples.

Appendix B

Identified Themes and Subthemes/Codes

Themes	Subthemes/codes
Evolving understanding and conceptualization of ID	• Instructional design as a creative endeavor • Instructional design is linear (novices) • Navigating perceptions and expectations versus reality. • Evolving/growing understanding of the ID process. • Shifting perceptions of evaluation. • Having to accept other's visions, definitions, perceptions
Critical reflections and identity development	• Mutual/reciprocal identity development through collaborative learning. • Building on perceived strengths • Identity development through personal and collective reflection.

	• Novice instructional designer identity transitions. • Identity modification through critical reflection. • Even novices have shortcuts to complete project tasks (heuristics)
Team roles and identity development	• Multifaceted roles in the ID project. • Project evolution leads to role changes. • Varied role perceptions among team members. • Experienced mentorship and role modeling. • Open-mindedness, communication, and distributed leadership. • Acknowledging individual expertise limitations. • Wanting to take on more responsibility and/or leadership roles. • Having to assume roles. • Willingness to do things for the good of the team/project.
Disposition and identity development	• Curiosity and shared desire for knowledge • Facing disappointment, challenges, roadblocks. • Prior beliefs about team dynamics • Hesitancy in group and team dynamics. • Cultural differences and beliefs • Valuing perspectives and prior experiences/knowledge and improving science learning
Limitations awareness and identity development	• Personal and collective awareness of limitations • Overcoming cultural, skill, experience, and knowledge differences. • Limitations related to lack of software development skills. • Eagerness to learn new technology and techniques. • Decision-making impacting time constraints (group think hindrances). • Skill deficits lead to less-than-ideal products. • Discrepancies between ideal and necessary. • Gaps in ID/Content knowledge/skills alignment
Communication and identity development	• Adaptation to uncertainty and communication skills. • Communicating needs and intentions • Encouraging others.

- When you don't fully agree with decisions, directions, and/or thinking.
- Practical learning impact on the project.
- Open-mindedness, communication, and distributed leadership.
- Trimming the fat – paring down vision and scope to meet the core aim/goals of the project.
- Conversations were necessary.
- Letting go of some ideas.

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