EFFECTS OF PERSONALIZED LEARNING AS AN INSTRUCTIONAL APPROACH ON STUDENTS' SELF-DETERMINATION AND LEARNING ENGAGEMENT IN ONLINE HIGHER EDUCATION
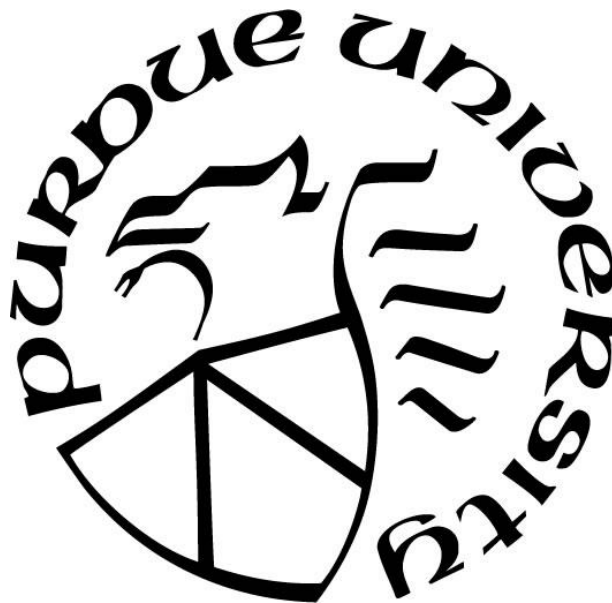
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I dedicate this dissertation to my parents, Abdulaziz Alamri, and Alia Alamri, who have been the greatest role models in my life. Your unconditional love and prayers motivate and encourage me to achieve the highest goals. I also dedicate this dissertation and my degree to my beloved wife, Ahlam Alamri, who has supported and encouraged me every single day during our journey to the USA. I did not make it alone, but we did it together. Without your love and support, I would not complete this mission and lifelong learning goal. Final dedication goes to my beloved kids, Juri, Abdulaziz, and Muhammed. I am sorry for spending all the time far from you, so thank you for your patience throughout these years.

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ABSTRACT

Author: Alamri, Hamdan. Ph.D.
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Title: Effects of Personalized Learning as an Instructional Approach on Students' Self-
    Determination and Learning Engagement in Online Higher Education
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Online higher education courses are often designed using a one-size-fits-all model that treats students as instructional users rather than participants who contribute according to their learning needs and interests. Although many scholars have discussed personalized learning as a means to customize instruction over the past three decades, few have investigated the impact of personalized learning interventions. In particular, there is a gap in the literature on interventions using customized instructional content in online courses to provide individuals with opportunities to address their own learning needs and choices. The purpose of this study was to investigate the effect of this instructional approach on students' self-determination, intrinsic motivation, learning engagement, and online learning experiences.

The researcher applied a convergent parallel mixed-methods design to collect, analyze, and merge quantitative and qualitative data simultaneously. Qualitative findings have converged with and diverged from the quantitative data. Quantitative results revealed that personalized learning has a statistically significant effect on students' perceived feelings of autonomy and their online learning experiences. The approach also showed a significant effect on students' perceptions toward their instructors. The findings showed that the majority of learners perceived personalized learning to be an effective instructional approach. According to the qualitative findings, this approach showed a positive effect on students' self-determination (autonomy and

competence), intrinsic motivation, engagement, and online learning experiences. However, the intervention did not show a positive effect on students' feelings of relatedness.

This study may contribute to the understanding of effective and influential teaching and learning approaches, especially in online learning environments. The final findings might inform educators, instructional designers, and instructors about the personalized learning potential of tailoring online courses to students' needs and interests, which may increase student motivation and engagement.

CHAPTER 1: INTRODUCTION

Background

The focus of education has been changing toward learner-centered to enhance students'

learning and better prepare them for the "information age" era (Watson, Watson, & Reigeluth,

2012). Barr and Tagg (1995) discussed the paradigm shift that made higher education learner-

centric to provide engaging learning opportunities for today's learners. The paradigm shift in

higher education has transformed instructors into learning designers and facilitators rather than

controllers of the learning process (Barr & Tagg, 1995). Current higher education practices,

however, are still focused on providing a one-size-fits-all model that shapes the learning

environment using instructional strategies and technologies that only enhance and support the

teacher-centered model, which focuses on learning from a standardized curriculum and progress

in time-based curriculum rather than skills mastery and knowledge acquisition (Demski, 2012).

Demski (2012) and Watson et al. (2012) emphasized that teacher-centered model may result in

learning gaps that affect "information age" learners and might prevent them from obtaining

knowledge and skills that they need to succeed in this era.

Online learning has become the recognized and preferred learning format for many

students from around the globe. Its ease of access has enabled online learning to evolve and grow

over the past decade. By the fall of 2016, more than 6 million college students had completed a

minimum of one course in a fully online format, which represents 31.6% of enrollment in higher

education institutions in the United States (Seaman, Allen, Seaman, 2018). Seaman et al. (2018)

reported that the number of students enrolled in online courses at the undergraduate and graduate

levels increased by 5.6% in 2016 and by 17.2% between 2012 and 2016, which represents a

steady increase within this period. These increases indicate that online learning is becoming more important to many learners, which require educators to pay attention to the design and development of online courses and programs.

Despite online learning's growth and increased enrollment, there are concerns about students' success, motivation, and engagement in online courses (Bawa, 2016; Horzum et al., 2015; Hung, Chou, Chen, & Own, 2010). Literature of online learning indicates that researchers have been dedicated to investigating and exploring a large number of elements (e.g., teaching, learning, interacting, and communicating) and factors (e.g., attitude, behavior, motivation, and engagement) that have affected students' learning in online environments. They have also made efforts to investigate instructional design and instructional strategies to deliver online learning courses (Bawa, 2016). However, course design has been focused on a one-size-fits-all model that assumes all learners have the same interests and needs (Demski, 2012), and it is not different in online learning course design to utilize one-size-fits-all model regardless to students' learning needs and interests.

Personalized learning as instructional approach can shift the focus of online learning toward more flexible environments. Sural and Yazici (2018) mentioned that online learning environment can be personalized through different methods of learning (e.g., adaptive learning). The authors stated that "implementers can provide more effective and appealing services by using different personalization methods in online learning environment" (Sural & Yazici, 2018, p. 106). Other researchers have suggested to personalize the interfaces of learning technology systems, and still others have suggested providing students with personalized feedback strategies. In addition, other researchers have suggested providing students with full control of the entire environment, whereas others yet have recommended giving learners limited control

over the learning environment (Barr & Tagg, 1995; Demski, 2012; Rickabaugh, 2012; Watson, Watson, & Reigeluth, 2012).

New Media Consortium (NMC) (2016) stated that personalized learning "consists of learning strategies, solutions, and interventions that align with individual learner goals and account for differences in background knowledge, passion or interest in topics, and subject mastery" (p. 28). In this approach, educators tailor the learning content to every individual's learning needs and interests and address individual differences within a single learning environment. Personalized learning allows educators to create learning pathways to enable learners to follow the direction that suits their learning needs and interests. Designing online courses that provide different pathways and tracks that are designed to meet different learners' needs and interests may improve online teaching and learning practices. Such pathways provide personalized content and activities that learners need to follow to address personal choices and learning needs.

Sural and Yazici (2018) stated that "individuals carry different personal features, have different learning styles, process information in different ways, prefer using different sources of information cause wide range of learning requirements" (p. 105). The authors recommended conducting studies to investigate providing every student with a personalized learning opportunity to address their personal differences. Personalized learning as flexible learning can be adjusted and directed toward every learner to increase their motivation and engagement when they learn online. Personalizing an online learning environment changes the instructor's role into that of a facilitator who guides and assists each learner rather than providing a one-size-fits-all model that provides every student with the same content, teaching and learning strategies, and impersonal, rapid-cycle feedback.

The effectiveness of personalized learning as an instructional approach is still undetermined, especially in online learning environments. This approach has not been investigated extensively in online learning studies. Essentially, online learning courses need to be designed and delivered to engage and motivate students to succeed in meeting their own learning goals. Students in online learning environments are adult learners, and they require educators to allow them to take the control over their learning to enhance their learning needs, interests, and choices (Barr & Tagg, 1995; Demski, 2012; NMC Horizon Report, 2016; Rickabaugh, 2012; Watson & Watson, 2017; Watson, Watson, & Reigeluth, 2012). Therefore, the implementation of personalized learning promises to benefit learners as they meet their needs, interests, and personal goals, and become more independent learners (Watson & Watson, 2017).

To achieve these promises, the researcher of this study utilized personalized learning principles to design, develop, and implement online courses to engage and motivate learners. Personalized learning has the potential to change how online courses are delivered. The researcher therefore conducted this study to examine the effect of this approach on graduate students' self-determination and online learning engagement and its relation to intrinsic motivation within online learning courses. The personalized learning principles (Barr & Tagg, 1995; Demski, 2012; NMC Horizon Report, 2016; Rickabaugh, 2012; Watson & Watson, 2017; Watson, Watson, & Reigeluth, 2012); self-determination theory (SDT); three perspectives (i.e., autonomy, competence, and relatedness) (Deci & Ryan, 1985, 2000); and online learning engagement (i.e., affective and behavioral engagement) (Dixson, 2010, 2015; Handelsman et al., 2005, 2009) provided the framework for investigating the study's variables.

SDT provides a motivation framework for investigating learners' self-determination and intrinsic motivation by examining their three basic psychological needs: autonomy, competence,

and relatedness (Deci & Ryan, 1985, 2000). The theory investigates "human motivation and personality… [and] highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation" (Ryan & Deci, 2000, p. 68). In educational settings, SDT encourages providing a learning environment that can support the three perspectives to maintain a higher level of intrinsic motivation that results in better learning.

SDT encourages educators to design motivational activities that encourage learners to understand their abilities and control their learning choices (Deci, Vallerand, Pelletier, & Ryan, 1991). Therefore, this theory served as the framework for investigating students' self-determination and intrinsic motivation when students receive personalized learning courses that address their learning needs and interests. The researcher of this study hypothesized that personalized learning courses have the potential to motivate learners and enhance their competence, autonomy, and relatedness, which reflect on their intrinsic motivation. Personalized learning and SDT share common learning principles, such as supporting learning choices and interests, independency, relevancy, and collaboration (Barr & Tagg, 1995; Deci & Ryan, 1985; Deci & Demski, 2012; Katz & Assor, 2007; NMC Horizon Report, 2016; Rickabaugh, 2012; Ryan, 2000; Watson & Watson, 2017; Watson, Watson, & Reigeluth, 2012).

Engagement is another factor that many educators and instructional designers strive to achieve in online learning environments. To improve online learning engagement, the researcher of this study investigated the effects of personalized learning on students' engagement in online learning environments and how those effects relate to graduate students' intrinsic motivation (Dixson, 2010, 2015; Handelsman et al., 2005, 2009). The researcher associated the engagement investigation with the SDT findings as another lens of the study's framework. Prior studies have confirmed the relationship between engagement and motivation (Coates, 2007; Dixson, 2010;

Gray & DiLoreto, 2016; Kuh, 2003; Kuh, 2009; Major, 2015), and this relationship informs the direction of this study to hypothesize that personalized learning can increase students' engagement. The researcher investigated behavioral and affective engagement as well as how implementing personalized learning principles in online courses affects these factors.

Research Problem and Study Purpose

Personalized learning (PL), as a learner-centered instructional approach, is a method of providing customized and flexible instructional content that addresses individual learners' needs and interests (Watson & Watson, 2017). Although there has been substantial literature discussing personalized learning to customize instruction over the past three decades (Demski, 2012; NMC Horizon Report, 2016), few scholars have investigated the impact of personalized learning interventions (Garrick, Pendergast, & Geelan, 2017; Wolper, 2016). In particular, few researchers have investigated interventions using customized instructional content in online courses to provide individuals with opportunities to address their own learning needs and choices.

Watson and Watson (2017) discussed personalized learning and its potential to be a different mode of teaching and learning in online learning formats. In addition, personalized learning principles, which include personalized learning goals, personalized instruction, learners' interests and choices, and learning self-drive, provide customized learning curricula that address individuals' learning needs and interests (Ainley, Hidi, & Berndorff, 2002; Bray & McClaskey, 2016; Sota, 2016; Watson & Watson, 2017). These personalized learning principles were implemented as the intervention to provide personalized instructional activities and practices to engage learners in online learning courses to encourage them to think about their learning and feelings and become self-learners and self-motivators.

Therefore, in this study the researcher investigated online instruction using personalized learning principles as the intervention. The study investigated the effect of this intervention on graduate students' self-determination and online learning engagement. The researcher applied SDT as the framework for investigating students' perceptions of the three basic psychological needs (competence, autonomy, and relatedness) and their relation to intrinsic motivation (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000) when enrolled in online courses that implement personalized learning principles. SDT has been used in education to understand students' self-determination from the three psychological perspectives and their relation to intrinsic motivations (Deci et al., 1991). Supporting the three basic needs is associated with higher academic engagement and better learning outcomes (Niemiec & Ryan, 2009). Thus, the researcher tended to investigate the potential of personalized instructional activities and practices to support their basic needs and its relation to their online learning engagement (Kuh, 2003; Dixson, 2010, 2015).

To examine the intervention's effects, the researcher applied a convergent parallel mixed methods design, using a quasi-experimental design and semi-structured interviews to collect quantitative and qualitative data that can reveal how and why those effects occurred. The researcher used the basic psychological need satisfaction scale (BPNS) to measure students' well-being and how that reflects on their intrinsic motivation from three different perspectives (autonomy, competence, and relatedness) (Deci & Ryan, 2000; Deci et al., 2001; Gagné, 2003). The researcher applied the online student engagement scale (OSE) to measure students' online learning engagement using the behavioral and affective subcomponents (Dixson, 2010, 2015). The researchers' overall assumption in this study was that personalization as a learning approach

has the potential to shift away from the current practice of providing one-size-fits-all online

courses and toward providing personalized e-learning courses that motivate and engage students.

Significance of the Study

Currently, online courses are being designed to teach all students together as if they had the

same interests and needs. Most online courses provide a one-size-fits-all design that may not

meet many students' learning needs and interests, and in most cases, these courses are not at the

right level regarding students' abilities. In some cases, these courses are not well designed for

enhancing the knowledge and skills that students will need for their careers. Personalized

learning may assist instructors in designing and developing online courses that tailor

instructional content and activities to students' learning needs and interests.

As educators, we are interested in the best methods for educating our students. This study

investigated the effects of implementing personalized learning in an online learning

environment; the findings will assist educators and online instructors in utilizing personalized

learning in their online course design and teaching. The hope of this personalized learning

intervention was to see students become more engaged, motivated, and satisfied to learn more

than in a traditional learning environment. Online learning instructors may benefit from the

study's findings in designing, developing, and implementing personalized courses that provide

students with more learning choices and some degree of learning control. MOOCs instructors

also may benefit from the study's findings to design and implement personalized MOOCs.

Research Questions and Hypotheses

A convergent parallel mixed methods design was applied to investigate the research

questions that reveal the effects of personalized learning on students' self-determination

(autonomy, competence, and relatedness) and their relation to intrinsic motivation. The researcher intended to investigate students' online learning engagement when enrolled in personalized courses. The researcher investigated quantitative and qualitative research questions to answer "what," and "how," questions. Therefore, the convergent parallel mixed methods design was applied for the purpose of treating both research question types (quantitative and qualitative) as of equal importance to revealing the true effectiveness of this approach on students' motivation and engagement.

1. What is the effect of personalized learning as an instructional approach on graduate students' self-determination and intrinsic motivation to learn?

2. What is the effect of personalized learning as an instructional approach on graduate students' online learning engagement?

3. How did graduate students' experiences differ between an online course with a one-size-fits-all approach and an online course with a personalized learning approach?

Self-Determination Theory Hypotheses

- *$H_{0,1}$*: Personalized learning as instructional approach will have no statistically significant effect on students' perceived feelings of autonomy.

- *$H_{0,2}$*: The intervention will have no statistically significant effect on students' perceived feelings of competence.

- *$H_{0,3}$*: The intervention will have no statistically significant effect on students' perceived feelings of relatedness.

Engagement Hypotheses

- $H_{0,4}$: Personalized learning as instructional approach will not statistically significant increase students' skills, emotion, participation, and performance engagement.

Online Learning Experience Hypotheses

- $H_{0,5}$: There will be no statistically significant difference between students' learning experiences in the personalized online learning course compared with students' learning experiences in the one-size-fits-all course.

- $H_{0,6}$: There will be no statistically significant difference between students' experiences with their instructors in the personalized online learning course compared with students' experiences in the one-size-fits-all course.

Terminology

Online Learning

Online learning is a method "that uses one or more technologies to deliver instruction to students who are separated from the instructor and to support regular and substantive interaction between the students and the instructor synchronously or asynchronously" (Seaman et al., 2018, p. 5).

Online Learning Course

An *online learning course* is a "course in which the instructional content is delivered exclusively via distance education. Requirements for coming to campus for orientation, testing,

or academic support services do not exclude a course from being classified as distance education" (Seaman et al., 2018, p. 5).

Online Learning Program

An *online learning program* is "a program for which all the required coursework for program completion is able to be completed via distance education courses" (Seaman et al., 2018, p. 5).

Personalized Learning

Personalization refers to:

instruction that is paced to learning needs, tailored to learning preferences, and tailored to the specific interests of different learners. In an environment that is fully personalized, the learning objectives and content as well as the method and pace may all vary (so personalization encompasses differentiation and individualization). (USDOE, 2010, p. 12)

Individualized Learning

Individualization refers to

instruction that is paced to the learning needs of different learners. Learning goals are the same for all students, but students can progress through the material at different speeds according to their learning needs. For example, students might take longer to progress through a given topic, skip topics that cover information they already know, or repeat topics they need more help on. (USDOE, 2010, p. 12)

Differentiated Instruction

Differentiation

refers to instruction that is tailored to the learning preferences of different learners.

Learning goals are the same for all students, but the method or approach of instruction

varies according to the preferences of each student or what research has found works best

for students like them. (USDOE, 2010, p. 12)

Personalized E-Learning Course

A *personalized e-learning course* is an online course that provides personalized content

and activities that suits learners' needs and interests.

Self-Determination Theory

SDT provides the "understanding of human motivation requires a consideration of innate

psychological needs for competence, autonomy, and relatedness" (Deci & Ryan, 2000, p. 227).

Self-Determination

Field, Martin, Miller, Ward, and Wehmeyer (1998) defined *self-determination* as "a

combination of skills, knowledge, and beliefs that enable a person to engage in goal-directed,

self-regulated, autonomous behavior. An understanding of one's strengths and limitations

together with a belief in oneself as capable and effective are essential to self-determination" (p.

2).

Competence

Competence refers to the "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Deci & Ryan, 2002, p. 7).

Autonomy

Autonomy refers to "being self-initiating and self-regulating of one's own actions" (Deci et al., 1991, p. 327).

Relatedness

Relatedness refers to "developing secure and satisfying connections with others in one's social milieu" (Deci et al., 1991, p. 327).

Intrinsic Motivation

Intrinsic motivation refers to behaviors controlled by internal reward, such as desire to learn for the sake of self-satisfaction. People who are intrinsically motivated have behaviors that they "are engaged in for their own sake, for the pleasure and satisfaction derived from their performance" (Deci et al., 1991, p. 328).

Engagement

Engagement refers to "the time and energy students devote to educationally sound activities" (Kuh, 2003, p. 25).

Online Student Engagement Scale

OSE scale is a modification of the Student Course Engagement Questionnaire (SCEQ) (Handelsman et al., 2005) to measure students' engagement in online learning environments (Dixson, 2010, 2015).

Limitations

Researchers have not extensively investigated the effectiveness of personalized learning as an instructional approach in online learning environment, which may limit this study. Researchers have discussed personalized learning as a theoretical framework and in terms of its principles, but implementing it still requires empirical evidences that reveals the true effectiveness of personalized learning, especially in higher education and online learning environments.

Another limitation to this study was the implementation of personalized learning principles in a structured online learning program that provides only one-size-fits-all courses. Students are used to learning from a one-course format during their entire program, and changing the course format may cause implementation challenges. Students might find personalized learning confusing because it takes them out of their comfort zones and asks them to choose among the pathways and tasks, which may become problematic for implementation. In the one-size-fits-all model, course design includes readings, assignments, activities, and assessments that treat students as having the same learning needs, interests, and choices. By contrast, personalized courses provide different learning pathways that include multiple reading options, different modality of learning materials, personalized assignments, and rapid and personalized feedback. Students become independent when they are given learning choices, and it can be challenging for some learners to determine which learning pathways they should follow.

The third limitation to personalized learning implementation was the difficulty of implementing self-pacing principles in online courses. This study took place in an online learning program that was designed to offer one-size-fits-all courses and progress in a time-based curriculum. Therefore, it was challenging to offer self-pacing opportunities for learners because the personalized course offered limited options for learners to self-pace their learning. This limitation was discussed thoroughly in the course design section in chapter two.

The fourth limitation was the use of self-reporting scales that measure students' motivation and engagement; therefore, there may be a bias toward success in this learning environment. This limitation could be an obstacle to investigating the true difference between the factors in the two online courses. Collecting qualitative data, however, might assist in overcoming this limitation and reveal aspects and experiences that the researcher cannot investigate using self-reporting scales.

Finally, this study may face some methodological limitations, which can reveal threats to the internal and external validity of the study's findings. In chapter three, the researcher discussed and rebutted each research design as well as the mixed-methods limitations using solutions that were discussed in the quantitative and qualitative research methods literature.

Chapter Summary

The purpose of this chapter was to introduce the study's purpose and importance. The problem of this study was the gap in the personalized learning literature regarding the effect of the instructional approach on graduate students' self-determination and online learning engagement. The purpose was to investigate the effect of personalized learning approach and report the most effective principles that can be used to design, develop, and deliver personalized e-learning courses that provide learning pathways and individualized content, activities, and

tasks that suit learners' needs and interests. The researcher used a convergent parallel mixed

methods design to investigate the research problem. The researcher applied a quasi-experimental

design for the quantitative study and conduct semi-structured interviews with the same groups

that participate in the quasi-experimental study to investigate their perceptions and experiences

qualitatively.

CHAPTER 2: LITERATURE REVIEW

This chapter includes a review of the frameworks that guide this research and a literature review of personalized learning definitions, theories, and principles that can be applied in higher education settings. The researcher presented a literature review of SDT and its application in education followed by possible strategies to support students' intrinsic motivation. This review included sections that align SDT support with personalized learning. The researcher discussed online learning engagement as a goal of supporting students' intrinsic motivation. In the literature review the researcher addressed the relationships among students' intrinsic motivations from SDT three perspectives—competency, autonomy, and relatedness—and online student engagement from emotional and behavioral perspectives. Finally, the researcher discussed the design principles that were applied to develop a personalized online course.

Theoretical Framework

The idea of personalized learning is rooted in the constructivism of Bruner to support autonomous, active, and independent learners (Watson & Watson, 2017). Constructivism emphasizes that knowledge is constructed and aims for reasoning, critical thinking, and understanding as well as the use of knowledge, self-regulation, and mindful reflections as the critical components of student learning. The instructor is mainly a guider and facilitator of the learning processes and is not involved in shaping learners' choices and interests. The learner's roles are those of knowledge constructor, active learner, investigator, and researcher. Learners lead their own learning and are responsible for identifying the knowledge and skills they need (Driscoll, 2013). Given learners' roles in this environment, personalized learning shapes student learning activities and the curriculum and allows learners to have greater control. Although some

researchers have suggested allowing learners full control, others have suggested limiting that control and focusing on other aspect of personalization, such as interest, flexibility, and choices (Ainley, Hidi, & Berndorff, 2002; Bray & McClaskey, 2016; Hidi & Renninger, 2006; Rickabaugh, 2012; Sota, 2016). In personalized learning environments, it is assumed that learners can know how they learn, which is an important component of constructivism (Driscoll, 2013). Student learning is controlled by their needs, interests, abilities, and learning preferences (Ainley, Hidi, & Berndorff, 2002; Bray & McClaskey, 2016; Hidi & Renninger, 2006; Rickabaugh, 2012; Sota, 2016).

In practice, personalized learning adopts Vygotsky's theory, which focuses on social interaction, contextualization, and the zone of proximal development (ZPD) model (Watson and Watson, 2017). Educators ,ust set the goal according to learners' needs and current abilities with scaffolding to achieve the potential development level. Vygotsky (1978) defined ZPD as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peer" (p. 86). The goal-setting theories of personalized learning adopt Zimmerman's (2002) self-regulated learning, in which learners' metacognitive behaviors and motivation guide the learning process.

Personalized learning also adopts Ames and Archer's (1988) goal-oriented theory, which prioritized students' mastery or performance of learning goals. Students who perceive mastery goals tended to use more "effective strategies, preferred challenging tasks, had a more positive attitude toward the class, and had a stronger belief that success follows from one's effort" (Ames & Archer, 1988, p. 260). By contrast, students who perceived performance goals "tended to focus on their ability, evaluating their ability negatively and attributing failure to lack of ability"

(Ames & Archer, 1988, p. 260). The authors concluded that mastery goals can facilitate

motivation and better learning if "adopted by students" (Ames & Archer, 1988, p. 260).

Additionally, personalized learning adopts Deci, Ryan, and Williams's (1996) self-

determination theory, which emphasizes the impact of goal setting on learners' achievements and

intrinsic and extrinsic motivation. According to SDT, both types of motivation should be

enhanced by social contexts that support students' basic psychological need for autonomy,

competence, and relatedness. The learning contexts should be "characterized by the provision of

choice, optimal challenge, informational feedback, interpersonal involvement, and

acknowledgment of feelings" (Deci, Ryan, & Williams, 1996, p. 165).

Kuh's (2001, 2003, 2009) engagement model was used to develop the National Survey of

Student Engagement (NSSE). This model is being used to assess student engagement and the

quality of instruction. The model states that "the more students study a subject, the more they

learn about it . . . [and] the more students practice and get feedback on their writing, analyzing,

or problem solving, the more adept they become" (Kuh, 2003, p. 25). The model emphasizes that

institutions design instructions that maintain a high level of quality to support student

engagement. The model utilized the "Seven Principles of Good Practices in Undergraduate

Education" that Chickering and Gamson (1987) developed. Kuh (2003) indicated that institutions

and educators must provide quality learning experiences that engage learners. The model caused

many studies to develop measurement scales for student engagement inside and outside the

classroom (Dixson, 2015). One of these studies was Handelsman, Briggs, Sullivan, and Towler's

(2005), which developed the SCEQ in a traditional classroom. Dixson (2010, 2015) then adopted

and modified the SCEQ to measure student course engagement in online learning environments.

In this study, therefore, the researcher adopted the mentioned theories to guide the implementation of personalized learning principles in an online learning environment. The framework that guided this study consists of different perspectives that the theories that stands behind personalization drive (Ainley, Hidi, & Berndorff, 2002; Ames and Archer, 1988; Bray & McClaskey, 2016; Deci, Ryan, and Williams, 1996; Hidi & Renninger, 2006; Rickabaugh, 2012; Sota, 2016; Vygotsky, 1978; Watson & Watson, 2017; Zimmerman, 2002). The researcher applied self-determination theory to guide the research procedures in investigating students' self-determination and intrinsic motivation (Deci, Ryan, & Williams, 1996). The researcher also applied Kuh's engagement model to investigate students' affective and behavioral engagement in the personalized online courses (Dixson, 2010, 2015; Handelsman et al., 2005; Kuh, 2001, 2009).

Personalized Learning

Definition

Personalized learning adheres to the learner-centered paradigm to create an environment that centers on the learner instead of the instructor. Redding (2014b) stated that personalized learning replaces the traditional educational model that relies on time, place, and pace with one that engages learners to meet their own needs, goals, and interests. Wolf (2010) mentioned that personalized learning transforms the traditional educational model that is mostly dominated by time-based content compilation, and it drives instructors toward a model that frees learners from those constraints, allowing them to progress at their own pace. The concept of *differentiation* provides different instructional strategies for different students, and the concept of *individualization* treats each student differently and allows them to drive their own learning. At the same time, personalization is "a fundamentally different mode of learning as the learner

drives their own learning, actively participating and designing their learning" (Garrick, Pendergast, & Geelan, 2017, p. 6). Instructors drive differentiation and individualization when they determine learning objectives and instructional strategies; personalization emphasizes that instructors become facilitators and provide educational guidance to each student (Garrick et al., 2017). A critical component that distinguishes personalized learning from other concepts is that it allows students to control and determine the direction of their learning (Halverson et al., 2015).

Personalized learning has varied definitions that might lead to different implementation and practice (Bray & McClaskey, 2015). Twyman (2014) defined personalized learning as a concept that "encompasses numerous components to support individualization, differentiation, and supporting each student's interests and motivation. These components may be philosophical, pedagogical, structural, or rooted in policy. Each may be implemented and evaluated individually, in combined initiatives, or an integrated whole" (p. 27). Demski (2012) defined personalized learning as an approach that "really takes into consideration that long tail of interest, of prior motivation, of languages. It leverages all the different things that people have in their repertoire to add value to their learning" (p. 34).

Personalized learning can refer to either the teaching practices that address individuals learning needs or "a system that contains the flexibility to adjust to the learning needs of the individual student" (Svenningsen, Bottomley & Pear, 2018, p. 205). The NMC Horizon Report (2016) defined personalized learning as "the range of educational programs, learning experiences, instructional approaches, and academic support strategies intended to address the specific learning needs, interests, aspirations, or cultural backgrounds of individual students" (p. 28). In this study, the researcher defined personalized learning as an approach that provides learning choices and tailors learning content toward individuals' learning needs, interests, goals,

and prior experiences to enhance knowledge and skills acquisition and support self-determination, intrinsic motivation, and learning engagement. The researcher utilized this approach to design and develop a personalized online course according to the principles of personalized learning as an instructional approach (Watson & Watson, 2017). Personalized learning considers each individuals' characteristics, interest, and needs and provides individually tailored instructional strategies, learning materials, and activities (Keefe & Jenkins, 2002). Personalized learning provides an organized learning structure for each learner to achieve their personal goals and independently maximize their learning.

Personalized Learning in Higher Education

Personalized learning has been trending in higher education recently. Administrators in some universities and colleges have realized that personalized learning can enhance students' learning and increase retention (Foss, Foss, Paynton, and Hahn, 2014). Personalized learning has the potential to provide customized learning instruction via learning pathways to tailor students' learning so they improve and master the needed expertise (Lessor, 2016). Today, most higher education institutions provide one-size-fits-all courses that follow a teacher-centered educational model, and they utilize a standardized curriculum that drives students' learning through time-based models (Demski, 2012). Therefore, the teacher-centered educational paradigm can harm "information age" learners and cause them to lack the skills and knowledge that are required in this era (Demski, 2012; Watson et al., 2012).

Personalized learning helps educators provide learning environments that free learners from the time, place, and pace constraints that dominate the traditional classroom and enhance their learning proficiency (Redding, 2014b). Spoelstra et al. (2014) indicated that personalized learning implementation in higher education helps close learning gaps and better prepares

students for the workplace. Spoelstra et al. (2014) also mentioned that personalized learning implementation can increase students' knowledge, skills, and confidence (as cited in Garrick et al., 2017). Foss et al. (2014) investigated the effect of personalized learning on student learning. They found that personalized learning contributed to students' using their learning time more effectively, provided learning choices, and supported hands-on activities. They also found that the implementation of personalized learning was especially successful when instructors believed that students had met the course objectives. Additionally, the study's authors found that personalized learning increased interaction among instructors and students.

Personalized Learning Principles

The researcher of the present study implemented personalized learning principles that might be applied in fully online learning environments and align with adult learning principles. Most of the principles that support personalized learning have primarily been investigated in a K–12 setting; there has been less focus on identifying the applicable principles that support learners in higher education—especially in online learning environments. The personalized learning universal principles, however, as well as some situational principles that Watson and Watson (2017) discussed, can be implemented in higher education and within online learning environments. The researcher of this study experimented with those principles in graduate-level online learning environments to improve students' learning experiences by tailoring the learning materials and content to their needs and interests. Those principles guided the design, development, and implementation of the personalized instruction in the online learning environment.

Personalized instructional goals

One core element of personalized learning implementation is that learners set their own instructional goals. Researchers from the Institute for Personalized Learning (2014) emphasized that in a personalized learning environment, the "learner and educator co-develop purposeful personalized goals to provide benchmarks and add focus, clarity and commitment to learning" (p. 1). To set instructional goals, educators must identify learning standards to shape the learning environment and guide students' learning goals. Watson and Watson (2017) stated that the process of personalization should encourage learners to set long- and short-term goals and structure their personalized learning plans according to the school standards. These goals should be set consciously to align with learners' abilities and competences (Watson & Watson, 2017). Learners, however, must identify their own strengths and needs for improvement so they can set their instructional goals and interact with learning materials for better learning (Bray & McClaskey, 2015). Thus, instructors may help learners identify their strengths and interests and provide mentoring throughout the learning process to ensure that learners attain their educational goals (Watson & Watson, 2017).

Personalized instruction

Most higher education institutions provide a one-size-fits-all course model for all learning modes (face-to-face, online learning, and blended learning). This model does not engage and motivate today's learners, who learn different materials through different instructional strategies and at their own pace (Horn & Staker, 2015). Corry and Carlson-Bancroft (2014) stated that personalized instruction enhances students' ability to decide, plan, and shape their courses of study according to their needs, interests, and learning objectives. Personalized learning allows educators to customize instruction and offer a variety of content, activities, and

materials that can address every students' needs and interests regarding the course topic. Personalized learning also delivers educational content by way of different instructional strategies and can be offered through different learning modes to maximize learning. Researchers from the Institute of Personalized Learning (2014) stated that personalized learning is "offered using a variety of methods (e.g. demonstration, discussion, simulation, small group) and modes (e.g. face-to-face, blended, virtual) in response to learner readiness, strengths, needs and interests" (p. 2). In addition, individualized and differentiated instruction can be implemented within a personalized environment to meet different individuals' learning needs, interests, abilities (USDOE, 2010).

Corbalan, Kester, and van Merriënboer (2006) proposed a personalized task-selection model (PTSM) that encourages educators to sharing control over learning and support learner choice when designing instructional tasks. The model entails two approaches to personalizing instructional tasks and allowing learners to control and select learning tasks: personalization using an instructional agent and personalization by the learner, who has control over learning and task selection. Corbalan et al. (2006) discussed sharing instructional control and how to avoid relying only on system-controlled instruction. When the learners rather than the system make selections and gain "control over particular aspects of their learning environment," it is most likely that self-regulated skills will be enhanced (Corbalan et al., 2006, p. 401). The authors also noted that when a learner selects from a variety of tasks that suit his or her personal interests and needs, it will most likely increase the learner's motivation, improving learning outcomes and achievements (Corbalan et al., 2006; Wolters, 2003; Zimmerman, 2002).

To provide effective personalized instruction, educators should carefully design task selection and learner control environments for novice learners. If a task selection environment is

not designed carefully, it may lead to cognitive overload (Corbalan et al., 2006). Researchers have found that providing a large number of tasks may increase cognitive load and overwhelm learners, negatively affecting their learning and causing them to fail to achieve learning goals (Corbalan et al., 2006). Although novice learners need more guidance from educators and instructional systems, experienced learners may benefit more from task selection environments and control their learning more efficiently because they usually have some degree of prior knowledge to assist them in selecting tasks (Corbalan et al., 2006). Therefore, the authors recommended helping learners to transition from system toward learner control.

Corbalan et al. (2006) experimented with the PTSM to share instructional control with learners in nursing school. The authors combined the model's two approaches: a technology system–controlled approach and a learner-controlled approach to providing task selection to learners. The authors found that personalizing learning tasks can result in more efficient and effective learning than does the one-size-fits-all model, which provides a limited and fixed sequence of learning tasks. The authors also stated that students found learning more favorable and appealing to their interests. Furthermore, they found that students in the learner-controlled environment scored higher on performance tests, expended less mental effort, rated higher in mental efficiency, and experienced higher interest in the learning tasks than did students in the system-controlled environment.

Zheng (2018) discussed the potential of designing and developing personalized learning experiences for students by integrating digital technology models that facilitate learning. The author stated that personalized learning might enhance learners' information processing; increase their chances for deeper learning; and assist them in acquiring, transferring, and applying knowledge. Zheng (2018), however, called for more future research to investigate personalized

learning to support deep learning with the assistance of different digital technology models that may facilitate learning.

Learner interest.

> Ainley, Hidi, and Berndorff (2002) defined *individual interest* as:
>
> a desire to acquire new information, to find out about new objects, events, and ideas not restricted to any narrow domain . . . [and] associated with a psychological state of positive affect and persistence and tends to result in increased learning. (pp. 545–546).

Hidi and Renninger (2006) stated that interest is "a predisposition to reengage content that applies to in-school and out-of-school learning and to young and old alike" (p. 122). Ainley (1998) found that individual interest relates to students' attitudes toward schooling and learning and usually "involve[s] seeking new knowledge and expanding existing knowledge" (as cited in Ainley et al., 2002, p. 546). The authors have studied this factor as a motivational component that influences students' learning, and they have concluded that individual interest is a contributing factor that affects cognitive and affective functioning and is considered to be a psychological state (Ainley, 1998; Ainley et al., 2002). Alexander, Kulikowich, and Schultze (1994a) investigated students' interest and found significant relationships with cognitive recall and prior knowledge. The authors also found that students' interest can predict their comprehension of physics texts (as cited in Weber, Martin, & Cayanus, 2005).

Hidi and Renninger (2006) proposed a four-phase model of interest development that details how an individual develops interest in a certain topic, event, or activity. According to the model, individual interest begins in situational interest that leads to the individual's maintaining situational interest; it then progresses to emerging interest that may lead to well-developed interest. The authors emphasized that different affects, knowledge, and values, which depend on

each situation and every individual, can shape each phase in the model. To trigger situational interest, the authors and others (Hidi & Baird, 1988; Lepper & Cordova, 1992; Solboda & Davidson, 1995) have recommended supporting the learning environment with appropriate learning activities, such as group work and computer activities. To maintain situational interest, the authors suggested implementing learner-centered approaches, such as project-based learning, cooperative learning, and one-on-one tutoring, to help learners maintain their situational interest (Hidi & Renninger, 2006; Hoffmann, 2002; Renninger et al., 2004). Educators, therefore, can externally supported emerging interest by allowing learners to interact with the learning environment (Hidi & Renninger, 2006; Hoffmann, 2002). The last phase of the model is well-developed interest, where "the student values the opportunity to reengage tasks for which he or she has a well-developed individual interest and will opt to pursue these if given a choice" (Hidi & Renninger, 2006, p. 115).

Personalization, therefore, is a learning approach that can enhance and support every individual's interest. Educators can utilize the instructional conditions or learning environments that Hidi and Renninger (2006) suggested to design personalized learning environments. Each instructional condition or learning environment aligns with personalized learning principles, and educators can therefore implement them to support learners' interest. Within this learning approach, educators may provide more choices that align with the learners' interests to enhance their curiosity and questioning and encourage them to spend more effort on learning.

For this study, the researcher believes that personalized learning has greater potential than the one-size-fits-all model to support learner interest and make learners feel valued and respected. Students may already have developed interest in a topic, but unfortunately, many educators are not aware of that interest. When an individual has already developed interest, that

interest will most likely enable him or her to maintain long-term endeavors (Hidi & Renninger, 2006; Izard & Ackerman, 2000) that will lead to higher performance to work on learning tasks (Alexander & Murphy, 1998; Hidi & Renninger, 2006) and result in remarkable achievement.

The main purpose of this study was to investigate the potential of providing instructional content and strategies that address learners' interests and support their learning orientations to support knowledge acquisition as well as the expansion of prior knowledge. Learners in higher education have some degree of learning direction and orientation and may have fully developed interests than younger learners do. For graduate students, it is assumed that they mostly have already developed interests over their learning journeys, and it is unfair to not offer courses that provide learning content, instructional materials, instructional strategies, and activities that address their learning interests. Research has shown that students learn content better when course materials and topics align with their interests (Hidi, 1990; Renninger, Hidi, & Krapp, 1992; Schank, 1979). It is promised that aligning the content toward learner interest may result in more engagement (Ainley et al., 2002), motivation (Deci & Ryan, 2000) and increase in cognitive and affective functioning (Ainley et al., 2002).

Learner choice

Personalized learning supports and considers learner choice as a critical component (Patrick, Kennedy & Powell, 2013). For instructors to create a list of choices may not provide students with fully personalized learning experiences (Bray and McClaskey, 2016). Learner choices, however, set personalized learning:

> apart from the related concepts of individualized and differentiated learning. Although these related concepts imply some change in instruction based on learner skills, knowledge, or performance, only personalization implies that the learner is an active agent in the decision-making process. (Sota, 2016, p. 57)

To involve the concept of learner choice, learners and instructors should collaborate to design the instructional choices that shape the learning environment and meet learners' interests, needs, and passions (Bray and McClaskey, 2016). Sota (2016) stated that "each part of an instructional episode—from setting goals to evaluating progress and achievement—can involve differing degrees of learner choice" (p. 60). Cordova and Lepper (1996) found that the provision of choice strategy can support students' choices, enhance their control over learning, and significantly increase their self-determination. Educators' collaborating with learners to codesign instruction may provide more learner choices, which may increase student learning and motivation (Corbalan et al., 2006, 2008, 2009; Sota, 2016). Kirschner and van Merriënboer (2013) found that full learner control over instruction can be challenging and may affect learners' progress and achievement. Personal control over learning refers to "the extent to which participants could set the parameters of their learning such as how and when they completed course assignments and how they engaged in self-regulated learning" (Clayton, Blumberg, & Auld, 2010, p. 355).

Corbalan et al. (2006) discussed the PTSM, which details how to design and implement task selection in personalized learning instruction. This model emphasizes that learner's choices should be personalized to support learning interests, and the choices must align with learning plans that draw on learners' prior knowledge, short-term goals, and long-term goals (Watson & Watson, 2017). Therefore, in the present study, the researcher examined learner choice and how it contributed to enriching students' learning and increase their engagement and motivation.

Personalization in online learning environments. Watson and Watson (2017) discussed personalizing instruction in online learning environment and the potential benefits that might lead to tailoring the content toward the learner's needs. Bagheri and Movahed (2016) found that personalized e-learning environments that are supported by adaptive learning systems can

enhance student learning. The findings indicated that in computer courses, students preferred the adaptive and personalized environment to the traditional one. The authors also examined associated factors that may influence students' learning performance and concluded that learning styles and prior knowledge play important roles in learning success in such environments. In addition, Zheng (2018) mentioned that although teachers and instructors provide personalized feedback to every individual in face-to-face settings, feedback in online learning environments tend to be fixed and predetermined, providing one form of feedback to all learners regardless their individual differences (prior knowledge, cognitive ability, etc.).

Personalized learning as a learner-centered approach allows instructors to design online courses that are relevant to students' learning interests. Park and Choi (2009) conducted a study to determine the factors that contribute to students' dropping online courses. Content relevancy was found to contribute to students' online learning dropout, and as a motivating factor that directly affected learning in online environments. The authors also found that online students were less likely to drop online courses that provided content relevant to students' lives. The authors recommended that instructors pay attention to the relevancy of the content to increase students' motivation in online courses. The authors also suggested that instructors can meet relevancy when designing online courses by providing students with content and activities that are relevant to their learning needs, interests, and experiences.

Sural and Yazici (2018) investigated the effect of personalized online learning environments on students' participation, learning performance, and satisfaction levels. The researchers designed a personalized online learning environment using a learning management system to allow learners to direct their own learning. Their course was designed to provide no personalization to those who did not want to personalize their learning and to allow those who

were willing to personalize their learning to do so. The course design allowed the learners to personalize the order of content and the appearance of course elements. Both quantitative and qualitative results indicated that half of the students were willing to personalize their learning experiences, were generally satisfied with their learning, and experienced a statistically significance increase in learning performance compared to students who did not personalize their learning.

Personalizing online learning environments, however, still lack for empirical studies that reveal the potential benefits of personalized learning as an instructional approach. Many researchers have recommended and encouraged incorporating personalization into online courses, but they have not provided design and development guidelines that assist educators in providing such environments. Therefore, the effect of this approach in online learning needs to be addressed as a lack in the personalized learning literature.

Personalized Learning Continuum

Personalized learning has different forms of designing learning environments and has variations on the implementation of its principles, which drive the amount of personalization that educators can provide to learners. Some educators provide fully personalized learning courses, whereas others implement the bare minimum of personalized learning principles. Rickabaugh (2012) indicated that personalized learning instructions and classrooms vary significantly. The author defined a personalized learning continuum that encompasses the variations among different principles of personalization. This continuum has three different types of personalized learning: *personalized to the learner*, *personalized with the learner*, and *personalized by the learner* (See Figure 2.1). Similarly, Bray and McClaskey (2015) described the "continuum of

choice" that defines three different types of educational roles in the personalized learning environments: *participant*, *co-designer*, and *designer*.
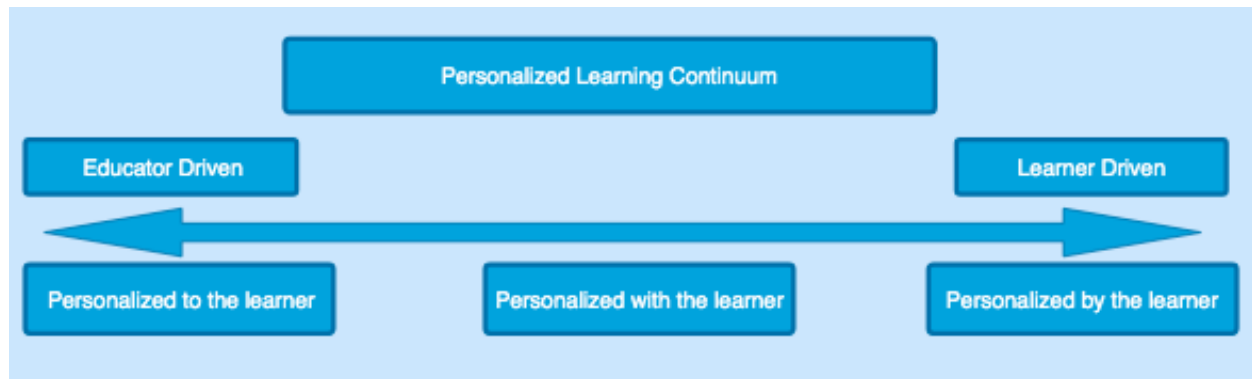
Figure 2. 1 Personalized Learning Continuum

Personalized to the learner. This environment provides learning tasks, choices among learning activities, and some degree of self-pacing and progressing to respond to the learner's needs (Bray & McClaskey, 2015; Rickabaugh, n.d., 2012). But this is not a fully flexible learning environment, and it is usually designed according to the learner's preferences and readiness (Rickabaugh, n.d.). At this stage of the continuum, Bray and McClaskey (2015) defined the learner's role as that of a *participant*:

> the teacher provides a menu of options for learners to learn content through images, videos, text-based resources, audio, hands-on activities, or interactions with peers. The learners showcase what he or she knows through different opportunities, from writing a paper to creating a performance. (p. 41)

Educators still lead and control the learning decisions to ensure that learners meet the same learning objectives. Through this stage, educators can still provide more learning choices that meet learners' interests and learning preferences.

Personalized with the learner

This environment falls in the middle of the personalized learning continuum (Bray &

McClaskey, 2015; Rickabaugh, n.d., 2012). It provides balanced control of the learning process

between educators and learners, and both "determine together the learner skills, readiness, clarity

of purpose and learning capacity necessary to address the challenge represented by specific

standards" (Rickabaugh, n.d., p. 1). Bray and McClaskey (2015) defined this stage as the *co-*

designer; here,

> the teacher is a tour guide for learning possibilities and then gets out of the way so
> learners can go on their own journeys. The teacher collaborates with the learners
> to brainstorm ideas for lesson design, assessment strategies, and types of tools and
> resources to use with activities and demonstrate evidence of learning. (p. 41)

Learners have more flexibility and lead their learning by determining their needs and personal

goals, and they progress toward more independent learning.

Personalized by the learner

At the far end of the continuum, a personalized learning environment provides full

control, independence, and active learning opportunities to learners, and educators serve as

experts and mentors (Bray & McClaskey, 2015; Rickabaugh, n.d., 2012). Learners have more

learning choices and "are taking increasing responsibility for planning their learning path,

monitoring their progress and demonstrating learning through a variety of means" (Rickabaugh,

n.d., p. 1). Bray and McClaskey (2015) defined this environment as one that support students in

becoming learning designers:

> the learners choose topics and direction for what they plan to design based on
> personal interests and questions generated individually or with peers. The learners
> acquire the skills they need to choose the appropriate tools and resources for
> developing and creating their designs. The learners can guide the design of their
> learning to explore their interests, talents, and passions to discover their senses of
> purpose. (p. 41)

In a completely personalized learning environment, educators must integrate advanced technology platforms to facilitate learners' control so students can design learning plans and customize their own learning profiles to account for their learning preferences (Lesser, 2016; Sturgis, Patrick, & Pittenger, 2011; Grant & Basye, 2014). Researchers from the NMC (2015b) emphasized the need to offer personalized learning environments in higher education with the assistance of new technologies that facilitate learning and progress to meet individuals' needs and personal goals.

The researcher of this study experimented with personalized learning principles that allow the instructors to provide education that is *personalized to the learner* because of multiple challenges to providing fully personalized learning environments in online learning programs. The first challenge was implementation in a traditional online learning environment that provides one-size-fits-all courses. In other words, graduate students were accustomed to learning from one course format for the entire graduate program, which imposed progress according to the course time frame instead of to the learners' own pace. Learners were supposed to start and end online courses at the same time. This challenge prevented from providing a fully personalized, learner-designed learning environment because of the weekly assignment deadlines that students must meet. In addition, the course is part of structured program that does not allow for personalization. This leads to personalizing only one course among other courses that adhere to a one-size-fits-all model.

The second challenge of personalizing online courses was implementing this approach without the assistance of advanced technology platforms (Watson & Watson, 2017). The course was offered only through an LMS that does not provide personalized learning features. That said, this study implemented personalized learning principles that provide personalized pathways and

learning choices, goals, and interests. The course also provided personalized readings, multimedia, learning activities, and tasks that allow learners to lead and control their education throughout the entire course. Instructors involved themselves as mentors and experts who guide students' learning and help students decide what to do for their personalized assignments to ensure that they meet the course objectives and program standards. In addition, instructors served as mentors who assist students in selecting one of the learning pathways that the course provides.

Personalized Learning Challenges

Implementing a personalized learning approach in higher education can be challenging. The lack of empirical and systematic research that addresses the effectiveness of personalized learning in higher education limits the implementation of this approach, especially in online learning environments. For educators, it is difficult to implement such an approach when it has not been extensively examined. Personalized learning literature is limited, and further research is needed to reveal the effect of this approach on students' learning. Wolper (2016) encouraged educators and researchers to examine personalized learning and report the effects to expand future implementation of personalization in higher education. The NMC (2015a) reported that personalized learning is "still evolving and gaining traction within higher education" (p. 26). Garrick et al. (2017) mentioned the lack of evidence-based empirical research that reveals the effectiveness of personalized learning in higher education. Personalized learning should be implemented and tested within different contexts in higher education to reveal all possible weaknesses and improvements to achieve better practices. Personalized learning as an instructional approach or learning program might solve many of the problems that higher education currently faces, including retention, learning progress, graduation rate, engagement and motivation (Alamri, Watson, & Watson, in press).

Implementing a personalized learning approach is challenging, especially without advanced technological support. Learning technology will not affect personalization in higher education "without explicit attention to the social contexts and ideological commitments that underpin and determine the ways in which these technologies are adopted and implemented in higher education" (Garrick et al., 2017, p. 8). Advanced technology (e.g., adaptive learning platforms and competency-based technology) can enhance institutions' and instructors' ability to track student learning and provide the needed support to every individual without extensive effort. Such technologies are still evolving, however, and will require some time to expand (NMC, 2015a). Mohd, Shahbodin, and Pee (2013) mentioned that "organizational support, teacher attitude, expectations, and technology itself" are challenges that face technology integration in personalized learning environments (p. 63).

Institutional resistance to the one-size-fits-all model for teaching and learning is often a critical challenge to implementing personalized learning in higher education. Personalized learning differs from the one-size-fits-all classroom; it is a flexible and customizable environment that provides choices and different learning modes to every learner. Thus, personalized learning may face substantial challenges within institutions that prefer to increase classroom size and rely on direct teaching as the major instructional strategy. Passionate educators and instructional designers should act to design, develop, and implement this approach to enhance student learning and transform the learning experience to make it more enjoyable and effective. Scholars of personalized learning have indicated that students benefit more from learning according to their own skills and competencies rather than by progressing in time-based, one-size-fits-all environment (Alamri et al., in press).

Challenges related to course design also prevented full implementation of personalized

learning principles. During the design processes, it was a challenge to provide a personalized

learning course in an online format because the program's structure emphasizes time-based

progression. Another challenge was the overall course format. Students previously had only one

online course format across the entire program, and it was a challenge to provide personalized

course within that online learning environment. Therefore, the researcher designed an online

course using personalized learning principles except for the self-pacing principle. It was a

challenge to avoid time-based progression on account of administrative rules.

Self-Determination Theory

Definitions

SDT investigates "human motivation and personality that uses traditional empirical

methods while employing an organismic metatheory that highlights the importance of humans'

evolved inner resources for personality development and behavioral self-regulation" (Ryan &

Deci, 2000, p. 68). Self-determination theory provides understanding of motivation that "requires

a consideration of innate psychological needs for competence, autonomy, and relatedness" (Deci

& Ryan, 2000, p. 227). Field, Martin, Miller, Ward, and Wehmeyer (1998) defined self-

determination as

> a combination of skills, knowledge, and beliefs that enable a person to engage in
> goal-directed, self-regulated, autonomous behavior. An understanding of one's
> strengths and limitations together with a belief in oneself as capable and effective
> are essential to self-determination. (p. 2)

SDT is a meta-theory for studying human motivation and personality, and researchers can

use it as a framework for investigating intrinsic motivation, extrinsic motivation, basic

psychological needs, and well-being in environments as well as how those factors connect with

and relate to each other to shape cognitive and social development (Deci & Ryan, 1985). The purpose of applying SDT as the self-determination and intrinsic motivation framework in this study was to determine the three psychological basic needs (competence, autonomy, and relatedness) that are essential for human growth, integration, and well-being within the social context (Ryan & Deci, 2000). SDT assumes that individuals should receive appropriate social conditions to support their needs: competence, autonomy, and relatedness to "maintain or enhance intrinsic motivation" (Deci, & Ryan, 2000, p. 263). Proponents of SDT have argued that the conditions that support the three basic needs increase higher-quality motivation and help individuals engage in activities, which then can support performance (e.g., learning performance) and creativity (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000).

The theory assumes that people tend toward psychological development and integration that encourages them to "seek challenges, to discover new perspectives, and to actively internalize and transform cultural practices" (Ryan & Deci, 2002, p. 3). SDT indicates that people are motivated to improve and change themselves; however, motivation is associated with social context and environment (Deci & Ryan, 1985). Although other theories, such as Bandura's (1977), Dweck's (1986), and Eccles's (1983), deal only with directing behavior toward favorable outcomes, self-determination theory defines the energy and direction of behaviors (Deci et al., 1991, 1991). The theory examines the social environments that influence self-motivation, social interactions, and well-being. The theory's three perspectives (competence, autonomy, and relatedness) define how individuals feel about their skills, knowledge, and beliefs, which direct personal goals, self-regulation, and autonomous behaviors. In the following sections, the researcher defined and discussed the three perspectives in detail.

Competence

Competence refers to "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002, p. 7). According to SDT, a competent individual "understand[s] how to attain various external and internal outcomes and [is] efficacious in performing the requisite actions" (Deci et al., 1991, p. 327). Individuals feel competent when they have the ability to perform effectively within a given social environment. The need to feel competent may guide individuals toward activities that are appropriate for their skills and knowledge levels. Alexander, Jetton, and Kulikowich (1995) found that, to feel competent, individuals tend to be inclined toward topics in which they have prior knowledge and experience. Substantially, competence does not mean attaining skills or abilities but that individuals feel confident and effective in their actions (Ryan & Deci, 2002).

Autonomy

Autonomy refers to "being self-initiating and self-regulating of one's own actions" (Deci et al., 1991, p. 327). Individuals feel autonomous through the internalization of their behaviors and actions. SDT ensures that someone will be autonomous and intrinsically motivated if he or she receives support for that autonomy. Ryan and Deci (2002) associated actions and behaviors that emerge from the state of autonomy with interests and personal values (Ryan & Deci, 2002). They argued that autonomy is always confused with independency. To be autonomous means "to feel volitional or willing to engage in a behavior," whereas to be independent means "to act without reference to or support from another" (Ryan & Deci, 2002, p. 236).

Relatedness

Relatedness refers to "developing secure and satisfying connections with others in one's social milieu" (Deci et al., 1991, p. 327). Individuals feels related when engaged in belongingness to their environment and culture, whether in the classroom or within larger environments, such as school and community. For individuals to experience caring from others (e.g., peers and instructors) arouses their sense of belonging, which then enhances their intrinsic motivation and well-being. In addition, relatedness is critical to understanding individuals' feelings of belongingness and the meaningfulness of their connections to other people (Kowal & Fortier, 1999).

SDT proposes meaningful connections and differences among the three psychological basic needs: competence, autonomy, and relatedness. According to SDT, competence is a precondition for motivation; however, feelings of competent cannot enhance intrinsic motivation until associated with feelings of autonomy, which then both enhances intrinsic motivation and helps individuals to perceive the locus of causality and self-determination (Deci et al., 1991; Ryan & Deci, 2000). Deci et al. (1991) also indicated that individuals can sometimes be competent but not intrinsically motivated—a state they associated with individual autonomy. In addition, there are connections between relatedness and the sense of autonomy. Deci et al. (1991) proposed that individuals' feeling related to their environment enhances their autonomy (Deci et al., 1991). Ryan and Deci (2000) concluded that "social contextual conditions that support one's feelings of competence, autonomy, and relatedness are the basis for one maintaining intrinsic motivation and becoming more self-determined with respect to extrinsic motivation" (p. 65).

Intrinsic Motivation

Intrinsic motivation refers to behaviors controlled by internal reward, such as the desire to learn for the sake of self-satisfaction. People who are intrinsically motivated have behaviors that they "are engaged in for their own sake, for the pleasure and satisfaction derived from their performance" (Deci et al., 1991, p. 328). Deci and Ryan (1985) theorized that intrinsic motivation enhances people's ability to work on activities that relate to their desires and inclinations regardless of external rewards, and their psychological basic needs for self-satisfaction guide. White (1959) stated that intrinsically motivated people seek efficacy and competence as guided by their internal desires (as cited in Deci & Ryan, 2000). Deci (1975) then proposed that intrinsic motivation means individuals' seeking feelings of competency and self-determination (as cited in Deci & Ryan, 2000). Activities that enhance intrinsic motivation lead to deeper engagement, which results in promotion and growth (Deci & Ryan, 2000). Deci and Ryan (2000) argued that extrinsic rewards can shift motivation from internal to external and undermine individuals' feelings of motivation, resulting in their feeling controlled.

Using SDT to Understand Learners

The theory has a wide use in different fields in which researchers try to understand factors that motivate human behavior. In educational settings, the theory has being used to provide lenses to understand student motivation and the associated motivating factors that affect learning. SDT helps educational researchers and educators to facilitate motivational activities that encourage learners to understand their abilities and control their learning choices (Deci et al., 1991). The theory emphasizes learners' motivation, which correlates positive results regarding their emotions and their belief in their abilities, knowledge, and skills, which eventually affect their learning achievements (Deci & Ryan 1996). Ryan and Deci (2000) indicated that

classrooms should have activities that enhance students' feelings of competence, relatedness, and autonomy to meet their need for satisfaction, which will result in higher intrinsic motivation and improved learning. Facilitating contextual conditions can enhance motivation, and performance and allow for social and cognitive development (Deci & Ryan, 2000; Ryan & Deci, 2000). A social context that includes conditions that help learners meet their basic psychological needs (autonomy, competence, and relatedness) has the potential to maintain high levels of intrinsic motivation (Deci & Ryan, 2000). At the same time, the context and "social environments that thwart feelings of autonomy, competence, and relatedness produce low levels of self-determination" (Garn & Jolly, 2013, p. 10). Self-determination conditions and activities can enhance students' feelings of competence and autonomy in relation to their learning environment. Providing opportunities that help students feel satisfied in terms of their basic needs can ensure students' intrinsic motivation. In fact, educators should provide opportunities that satisfy students' autonomy to ensure their self-determination and avoid providing opportunities that trigger feelings of being controlled (Deci & Ryan, 2000; Glynn, Aultman, & Owens, 2005; Ryan & Deci, 2000).

Glynn et al. (2005) mentioned that these feelings and beliefs will enhance college students' intrinsic motivation and improve their learning experiences during college. SDT emphasizes that educators should implement activities that enhance intrinsic motivation and encourage students' feelings and beliefs regarding their competences and abilities; activities that enhance only extrinsic motivation may undermine students' beliefs and feelings of competence in their abilities. SDT emphasizes that learners should have the motivation and regulation to be self-determined and not controlled by external contingences and conditions (Deci & Ryan,

2000). Individuals struggle and become unhappy when they feel that they have lost control over their achievements (Glynn et al. 2005).

Personalized Learning and Self-Determination Theory

The purpose of applying SDT in this study was to understand students' perceived feelings of autonomy, competence, and relatedness and their relation to intrinsic motivation when enrolled in personalized online learning environment. This environment provides practices that can most usefully enhance students' learning interests and preferences by tailoring activities to their individual needs and performance levels.

Self-determination theory provides the components that facilitate the design and development of activities with the incorporation of personalized learning principles to provide a learning environment that accommodates students' learning needs and psychological needs by supporting their feelings of competency, autonomy, and relatedness, which will result in intrinsic motivation (Barr & Tagg, 1995; Cordova & Lepper, 1996; Deci & Ryan, 1985, 2000; Demski, 2012; Glynn et al. 2005; Katz & Assor, 2007; NMC Horizon Report, 2016; Rickabaugh, 2012; Ryan & Deci, 2000; Watson & Watson, 2017; Watson, Watson, & Reigeluth, 2012). Such a learning environment can provide students with the opportunity to tailor their educations toward their individual needs to maximize learning. Educators have the potential to provide personalized activities to encourage students' intrinsic motivation. Once learners are intrinsically motivated, they will have the chance to develop competencies that allow them to work toward positive results in their learning. Learners also develop autonomy feelings regarding their abilities.

Niemiec and Ryan (2009) stated that "evidence suggests that teachers' support of students' basic psychological needs for autonomy, competence, and relatedness facilitates students' autonomous self-regulation for learning, academic performance, and wellbeing" (p.

133). Educators can use SDT strategies to design activities that support autonomy, competence, and relatedness. This proposal could improve students' interest and preferences in their learning. Cordova and Lepper (1996) investigated personalization as a strategy to enhance intrinsic motivation by aligning learning activities and materials to students' interests. The authors experimented with a learning program that utilized contextualization, personalized learning, and provision of choices as strategies to enhance students' intrinsic motivation. The results revealed that students with personalized learning strategies especially liked the learning program and were willing to spend more time on the learning program. The authors concluded that the three strategies contributed significantly to increases in students' intrinsic motivation. Niemiec and Ryan (2009) mentioned that supporting the three basic needs correlates with higher academic engagement and better learning outcomes, but when students feel frustrated and less supported, they are likely to be disengaged and experience poor learning outcomes.

Personalization to support autonomy

Black and Deci (2000) explained that supporting autonomy as:

> an individual in a position of authority (e.g., an instructor) takes the other's (e.g., a student's) perspective, acknowledges the other's feelings, and provides the other with pertinent information and opportunities for choice, while minimizing the use of pressures and demands. (p. 742)

Reeve (2002) indicated that learning experiences that provide choices to foster learning interests can support autonomy. By contrast, controlled learning environments that provide external rewards may decrease learners' perceived autonomy (Reeve, 2002). According to SDT, learning environments that support learning choices and interests are more likely to support perceived autonomy and competence (Garn & Jolly, 2013).

Stefanou et al. (2004) proposed that supporting autonomy takes three forms: (a)
organizational autonomy support, (b) *procedural autonomy support*, and (c) *cognitive autonomy support*. To support organizational autonomy within a learning environment, Stefanou et al. (2004) proposed that instructors allow students to decide their class management, take responsibility for their assignment due dates, and select their preferred evaluation methods. The authors suggested supporting procedural autonomy by implementing strategies that allow students to "choose materials to use in class projects, choose the way competence will be demonstrated, display work in an individual manner, discuss their wants, and handle materials" (Stefanou et al., 2004, p. 101). Finally, instructors can implement cognitive autonomy support by providing "opportunities for students to evaluate work from a self-referent standard . . . discuss multiple approaches and strategies, find multiple solutions to problems . . . receive informational feedback, formulate personal goals or realign task to correspond with interest, debate ideas freely, [and] ask questions" (pp. 97, 101).

Within a personalized learning environment, students are expected to be active, independent, and autonomous. These expectations are rooted in constructivism theory of Bruner (Watson & Watson, 2016). Constructivist scholars have stated that knowledge is constructed for the purpose of reasoning, critical thinking, self-regulation, and mindful reflection as well as the understanding and use of knowledge (Driscoll, 2013). When designing personalized learning environments, instructors and educators may apply these strategies to support students' feelings of autonomy.

Stefanou et al. (2004) recommended supporting autonomy by implementing variety of strategies (e.g., supporting decision making, learning choices, learning interests, active learning, and learning preferences), in which these strategies align with personalized learning principles.

Integrating these strategies in a personalized learning environment can be effective and highly

efficient because of the flexibility that personalized environments may have. In traditional

learning environments (e.g., controlled learning environments), it will likely be hard to

implement autonomy-support strategies. Personalized learning environments treat each learner as

a unique individual rather than one within a group. The authors of this study hypothesize that

personalized learning can support students' feelings of autonomy that directly affect their

intrinsic motivation.

Personalization to support competence

Deci et al. (1991) indicated that perceived competence is linked to intrinsic motivation.

SDT emphasizes that educators should help students feel competent by providing optimal

challenge activities and performance feedback. Perceived competence is associated with

perceiving one's own capabilities and capacities for learning. Blaschke (2012) stated that

"capability is then the extension of one's own competence, and without competency there cannot

be capability" (p. 5). Garn and Jolly (2013) stated that "feelings of competence are promoted

when learning environments differentiate tasks at the appropriate level of challenge for high

ability students" (p. 11). In their experimental study, Cordova and Lepper (1996) investigated the

effects of contextualization, personalized learning, and choices on students' perceived

competence; they found that students in the personalized learning group perceived their feelings

of competence to be significantly higher than the control group. Other studies found that higher

levels of intrinsic motivation resulted from positive and constructive feedback than from

providing negative feedback, which then correlated with perceptions of competence (Deci et al.,

1991; Vallerand et al., 1989). Positive feedback was found to enhance intrinsic motivation,

whereas negative feedback could decrease intrinsic motivation (Deci et al., 1991; Vallerand et

al., 1989). In addition, giving students meaningful learning choices proved a supportive strategy for feelings competence (Garn & Jolly, 2013). SDT emphasizes that when a learning environment enhances learning interests, students will likely feel supported in terms of their relatedness and competence (Garn & Jolly, 2013). In conclusion, the strategies that scholars have found to support perceived competence (i.e., learning choices, learning interests, task differentiation, individualization, optimal challenges activities, and constructive performance feedback) are the core principles and strategies of personalized learning environments.

Personalization to support relatedness

According to SDT, supporting perceived relatedness facilitates intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). Effective communication among instructors and students can support students' feelings of relatedness to the environment (Garn & Jolly, 2013). In particular, communication in online learning is critical to students' success and can lead to dropout. Relatedness is a basic need for students to maintain their feelings of belonging to the learning environment (Kowal & Fortier, 1999). Many researchers are investigating the sense of relatedness in online learning environments because of the inability to enhance this feeling to support students' success in such environments. Students feel isolated in online learning environments when they are left without support and must interpret assignments and learn independently (Howland & Moore, 2002). Instructors and educators should consider supporting students' feelings of relatedness to ensure their success. Connell and Wellborn (1991) indicated that instructors must show interest in and support for every learner to maintain students' feelings of relatedness. Sung and Mayer (2012) emphasized that educators should design online courses to support social presence to engage students with each other and allow for better communication and socialization; assignments should not support isolation. In addition, Garn and Jolly (2013)

stated that "learning environments that focus on cooperation, encouragement, and inclusion are more likely to produce feelings of relatedness than those that concentrate on social comparison, competition, and exclusion" (p. 11). Peer acceptance also plays an important role in supporting relatedness in learning environments (Deci & Ryan, 2000; Ryan & Deci, 2000). Personalized learning emphasizes that instructors work closely with every individual in the classroom and maintain close relationships that support how students perceive relatedness within the learning environment. Further, personalized learning can allow for cooperation and collaboration, which can be effective strategies for supporting relatedness. Therefore, the researcher in this study investigated the effects of personalized learning as an instructional approach on students' perceptions of autonomy, competence, and relatedness and the relation of these three perspectives to their intrinsic motivation.

Learning Choices and Self-Determination Theory

Researchers have investigated students' self-determination and the possibility of increasing their determination and intrinsic motivation by providing learning choices and allowing learners to control their behaviors and learning (Glynn et al., 2005). One of the most critical components in SDT is giving learners choices to enhance their behaviors to support autonomy, competence, and relatedness. SDT provides the framework for educators to investigate the effects of supporting individuals' basic needs by using learning choice strategy. This strategy can facilitate the process of internalizing extrinsic and intrinsic motivation to synthesize and develop self-determined behaviors that lead to fully integrated self-regulation that supports life-long learners (Katz & Assor, 2007).

Personalized learning encounters students' choices by allowing students to decide for their learning directions and pathways according to their interests and goals. Choices play a

critical role in enhancing students' intrinsic motivation, and might enhance basic psychological needs within the social contexts: autonomy, competence, and relatedness. Katz and Assor (2007) proposed this claim; they used self-determination theory as a framework to understand both students' intrinsic motivation and their perceived feelings of autonomy, competence, and relatedness when given learning choices. They indicated that choices may improve the performance of students who receive options that are relevant, are appropriate to their competency levels, and correspond to their cultures. Moreover, learner choice has a significant influence on students' intrinsic motivation, and extensive research has shown that providing choices can increase individual performance and enjoyment (Cordova & Lepper, 1996; Zuckerman, Porac, Lathin, Smith, & Deci, 1978). Assor, Kaplan, and Roth (2002) indicated that although providing meaningless choices may not influence students' autonomy directly, choices should address relevancy and personal interests to support autonomy. The authors elaborated that the "extent to which one's actions reflect one's personal goals, interests or values" can effectively support autonomy (Assor et al., 2002, p. 273).

Engagement

Definition and Principles

Kuh (2003) defined student engagement as "the time and energy students devote to educationally sound activities" (p. 25). This definition was used to develop the National Survey of Student Engagement (NSSE), which provided the knowledge to the National Center for Public Policy and Higher Education to issue the National Benchmarks for Educational Practices as well as the College Student Report. The premise of student engagement was that "the more students study a subject, the more they learn about it . . . [and] the more students practice and get feedback on their writing, analyzing, or problem solving, the more adept they become" (Kuh,

2003, p. 25). Kuh (2003) also indicated that when college students are more engaged in learning, they will likely develop lifelong learning habits and personal development. Kuh (2001) utilized the "Seven Principles of Good Practices in Undergraduate Education" that Chickering and Gamson (1987) developed. The seven principles include "student-faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning" (Chickering & Gamson, 1987, p. 2). Kuh (2001) used these seven principles to develop the NSSE, which U.S. colleges and universities then used and has become one of the most import surveys for measuring student engagement. The NSSE survey was "specifically designed to assess the extent to which students are engaged in empirically derived good educational practices" (Kuh, 2001, p. 2). Kuh's (2003) main recommendation was for educators to provide quality learning experiences and instruction that includes effective activities to ensure student engagement.

Engagement Factors in Online Learning

Many researchers have confirmed that engagement relates to many factors that directly affect students learning, and instructors should address these factors to ensure that the best learning occurs. Major (2015) found that motivation, attention, involvement, and intellectual effort assisted students as they engaged in learning and development. Other factors that correlated with engagement include effort, self-confidence, attitude, personality, active learning, commitment, involvement, and interaction (Coates, 2007; Dixson, 2010; Gray & DiLoreto, 2016; Kuh, 2003, 2009). In online learning environments, engagement relates to academic learning achievements and outcomes and can be identified as the most critical factor that instructors and designer pay attention to when designing online courses and programs (Dixson, 2010, 2015; O'Shea, Stone, & Delahunty, 2015). Supporting and encouraging relationships in online courses

will also result in more connection as well as prevent isolation, which often occurs in online

learning environments (Hampton & Pearce, 2016).

Online Student Engagement Scale

Handelsman et al. (2005) developed the SCEQ to investigate engagement factors in

traditional classroom. The scale consists of four factors that explain student engagement in

traditional classroom. These factors were included to determine how students act and feel toward

their learning. The scale included:

> skills engagement (what students "do"); emotional engagement (how connected
> they feel to the course/content, which is especially important in online courses;
> how applicable they feel it is); participation/interaction engagement (interacting
> with others, enjoying the content/course); and performance engagement (students'
> desire/goal to succeed in the course). (Dixson, 2015, p. 5)

The factors contain affective and behavioral components that reveal how students dedicate their

time and energy as they learn. Dixson (2015) stated that SCEQ "held a stronger theoretical

foundation about engagement and measured not just perceptions of attitudes but also perceptions

of behaviors" (p. 5); he also held that it aligns with the social constructivist theory and

Community of Inquiry Model. Thereafter, Dixson (2010, 2015) adapted the SCEQ from

Handelsman et al. (2005, 2009) and modified the scale to measure online student engagement

(OSE). The author removed item that specifically measured engagement in traditional

classrooms (e.g., coming to class everyday and raising one's hand in class). The author examined

the four factors and found that they significantly explain student engagement in online learning

environments. Dixson (2015) indicated that using these four engagement factors can help

researchers investigate online course design and inform online instructors about students'

engagement levels when students receive choices. The author also mentioned that this scale

indirectly measures teaching effectiveness in online learning.

Although student engagement consists of many factors that should be investigated in online learning environments, the researcher of this study focused on examining the four factors of engagement that Handelsman et al. (2005) constructed and Dixson (2010, 2015) modified to measure online learning engagement. Therefore, the purpose to investigate student engagement using the four-factor OSE scale resulted from the gap that exists in the literature. Scholars have yet to investigate online learning engagement using these four factors when students receive a personalized e-learning experience. The researcher used the four factors as dependent variables to examine personalized e-learning effect on student engagement. In addition, the authors used the OSE scale because of the well-developed items that were valid and reliable for measuring online student engagement.

This personalized experience differs significantly from other online course designs that focus primarily on text-based content or lectures. The hypotheses of this study stated that if students receive personalized e-learning courses, then they have the potential to increase their skills engagement, emotional engagement, participation engagement, and performance engagement. Students received a personalized experience consisting of activities and content that should enhance their connections and social interactions with both faculty and other students. The course offered many choices for learners to align the learning experience to their needs, interests, and personal goals to enhance their emotional engagement, performance, and participation. The course also offered a moderate level of learner control over learning, which the researcher hypothesized as to increase students' engagement in general and "skills engagement" in particular.

Personalized E-Learning Course Design

Educators can personalize online learning environments by customizing the learning content, activities, assignments, and assessments and differentiating instructional strategies to address different learners' learning needs. The course design mainly focused on providing learning choices, relevant materials that align with students' present or future jobs, instructional content that can be aligned to individuals' interests, and authentic practices that target the majority of students' backgrounds. During the previous offering of the course (one-size-fits-all course), students faced issues with instructional content that had been designed without any flexibility that would have allowed students to personalize the content to their needs, interests, and job practices. The course was initially designed using a one-size-fits-all model. By examining students' needs and interests in this course using a learner analysis, the researcher found that three different learning pathways (K–12, higher education, and corporate training) were the foci of students who had enrolled in the course (See Figure 2.2).
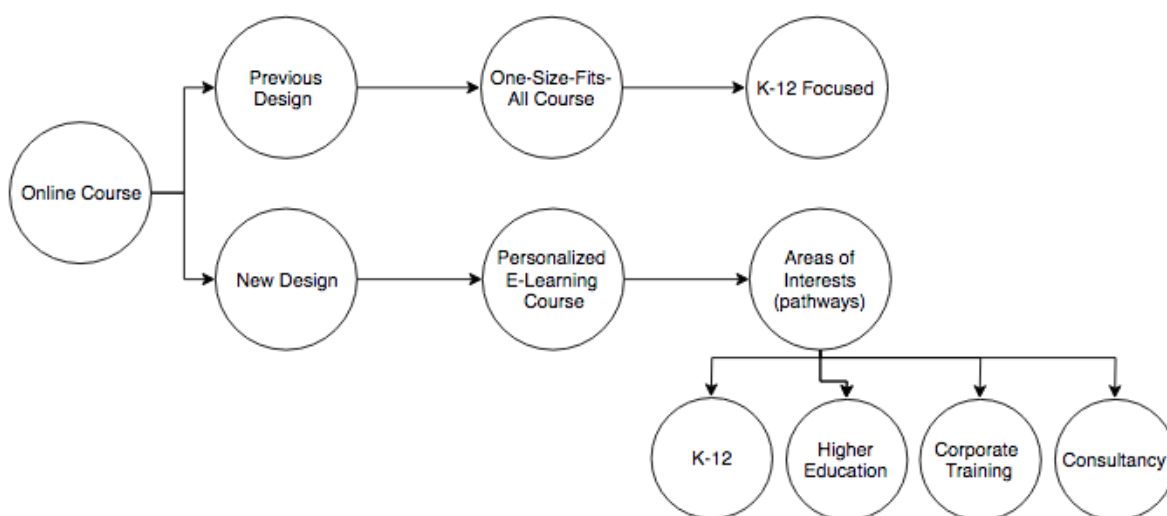
Figure 2. 2 Previous and New Course Design

Therefore, the designer utilized personalized learning principles to redesign the course and provide the needed learning content, assignments, activities, and assessment. Specifically, the designer provided personalized content to meet the three different learning needs for different students in the learning design and technology field. The course designer also provided flexibility for students who need to focus on different learning pathways to address their learning needs (i.e., instructional design consultant). The designer provided personalized course content that was tailored to the three different pathways; it included different textbooks, case studies, articles, instructional videos, and external links as well as a variety of learning resources. In addition, the designer allowed students to substitute different learning content and resources for the learning resources required in the course. The designer modified the course to include personalized learning principles that give students the opportunity to enhance their personal experiences and learning choices. Generally, the designer embedded learning flexibility in the course to address learning interests and needs so students can control and form their own online learning experiences.

The intervention in this study provided a personalized course through two dimensions: course curriculum (learning pathways, assignments, readings, and discussion boards, etc.) and instructors (feedback, assessment and evaluation, interaction, and facilitation, etc.) (See Figure 2.3). The course curriculum was personalized by the designer using the *personalized to learner* strategy to set three learning pathways. These pathways included personalized content that would suit every individual who might join the course. The second dimension was personalization through instructors to facilitate and scaffold students' learning and personalize the course for every individual. Instructors were provided with a training plan and documents that explained

how to implement personalized learning and work with individuals to tailor the course to their

needs (See Figure 2.3).
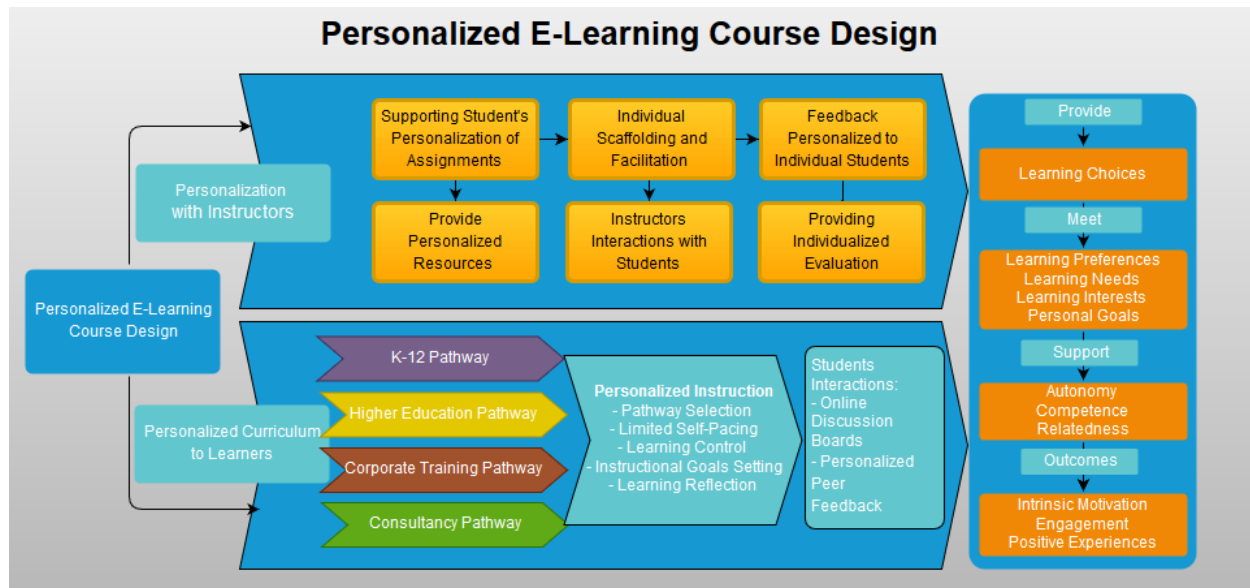
Figure 2. 3 Personalized E-Learning Course Design: Personalization through Curriculum and
Instructors

The reason for personalizing this online course was to provide students with the learning

flexibility and choices that prior researchers have associated with greater learning engagement

and motivation (Barr & Tagg, 1995; Cordova & Lepper, 1996; Deci & Ryan, 1985, 2000;

Demski, 2012; Glynn et al. 2005; Katz & Assor, 2007; NMC Horizon Report, 2016; Rickabaugh,

2012; Ryan & Deci, 2000; Watson & Watson, 2017). The designer focused on designing the

learning environment to enhance students' learning interests and choices within a flexible

environment to address their needs and ensure that every learner could find what suited her or his

learning needs regarding the course content.

As defined in the personalized learning continuum, personalized instruction can be

"personalizing to the learner, personalizing with the learner, or personalizing by the learner"

(Bray & McClaskey, 2015; Rickabaugh, n.d., 2012) (See Figure 2.1). This theoretical explanation guided the designer of this course in tailoring it to the learners' needs and interests. According to the literature, personalizing instruction can provide students with a learning environment that offers them learning tasks, allows them to choose among activities, and gives them some degree of self-pacing and progress to address their learning needs and interest. The learner in this environment is a participant who can select from a learning menu that addresses personal goals. This selection includes instructional strategies and materials that align the learning to the personal level. Instructors still control deadlines and some decisions (i.e., assessment and evaluation) to ensure that learning meets the course parameters, but learning choices, preferences, and interests remain characteristics of this environment (See Figure 2.4).

At the beginning of the course, Instructors asked students to select the learning pathway that best suited their learning needs and interests. Then, students were asked to share their personal goals and why they selected their pathways. Students were also asked to align their personal goals with the course objectives, content, and assignments and the focal points of the weekly discussions. Furthermore, the course was designed to re-emphasize personal learning goals and align with course objectives. This step was ensured through the weekly discussion forums, which encouraged students to reflect on their own learning. The designer and instructors ensured that the course provided students with full independency to select and work on what they thought would suit their learning within the course parameters to ensure that students could meet the overall course objectives.
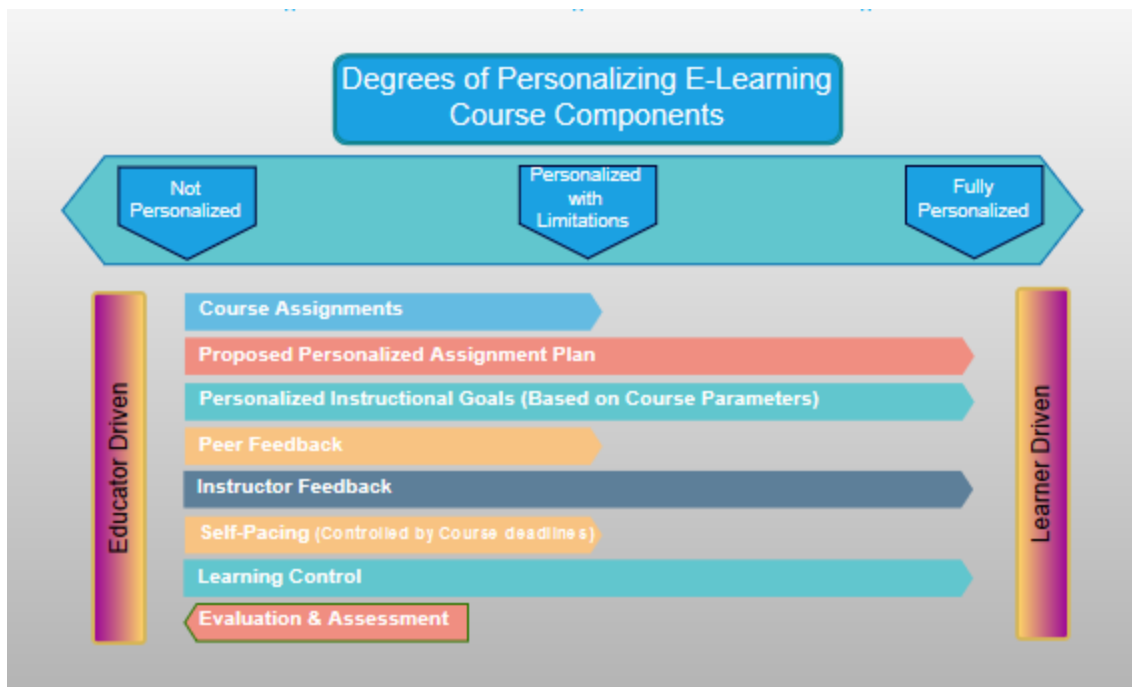
Figure 2. 4 Degrees of Personalized E-Learning Course Components (*the extent of personalization of course components and within the course parameters*)

Learning Pathway

The main purpose of this study was to investigate the effectiveness of personalized learning as an instructional approach that uses pathway learning. The course designer mainly focused on incorporating three different pathways that encompass students' learning needs, interests, preferences, and backgrounds. Students were given the option of selecting their personalized pathways and progress according to their prior knowledge and experiences. Each pathway provided relevant content and material that allows each student to gain the skills and knowledge most applicable to his or her background and workplace. Each pathway contained a repository that included different learning resources for each week. Students were allowed to select activities, readings, and final projects that meet their goals within the course parameters and objectives. Every learning pathway had different discussion prompts that are personalized to

the learning pathway topics, but students discussed the prompts all together under one thread to encourage greater engagement and interaction among students.

Personalized Assignment

The course designer implemented flexibility as the course assignments' main component. Students were given the opportunity to design their assignments based on their area of interest, including the topic, context, assignment components, and associated learning content that will help them complete the assignment. Further, the designer provided a "Proposed Personalized Assignment Plan" that provides students with a template for creating assignments that meet the course objectives and standards. Students can change the course assignments to different ones that better suit their learning needs and interests. The proposed personalized assignment plan description is as follows:

> The Learner-Centered Pedagogies/Approaches Web-Enhanced Lesson is a three-part assignment. You may choose to create a plan for this assignment that aligns more with your learning interests and needs than the project description and requirements do. You may prefer to design and develop a different project that aligns with the course objectives. With your instructor's permission, you may be able to design and develop a modified project.

> If you would like to design and develop a modified plan, we are providing a "proposed personalized assignment plan" template to assist you in tailoring this assignment to your learning needs, interests, and goals. The assignment modification must meet the course objectives and must be submitted in three parts for instructor feedback.

> You must submit this plan to your instructor by the end of week 2 so your instructor can provide feedback, potentially approve your plan before you start your project, and ensure that your project meets the course objectives. You will need to modify or create rubrics for your project. Your instructor will evaluate your proposed plan, including your assignment rubrics.

Personalization in Online Discussion Board

Discussion forums were designed to include all students. Most of the discussion forums and threads, however, were created according to the identified learning pathways, meaning that students will join the personalized forums according to their learning pathways to provide each other with personalized feedback as well as in-depth insights and experiences. The purpose of personalizing the discussions was to increase students' relatedness and connection with each other (Deci & Ryan, 2000; Ryan & Deci, 2000) and to enhance their learning engagement by grouping them according to their learning needs and interests.

Personalized Feedback

Zheng (2018) mentioned that in face-to-face settings, teachers and instructors provide personalized feedback to every individual, whereas in online learning environments, feedback tends to be fixed and predetermined to provide one form of feedback to all learners regardless of their individual differences (prior knowledge, cognitive ability, etc.). The personalized feedback principle indicates that within a personalization environment, students should receive personalized feedback to optimally pace and enhance their learning. Instructors provide an ongoing feedback cycle throughout the course. This process has a timeline that controls the act of providing feedback, meaning that students will receive feedback on their assignments, discussions, and activities within the same time frame for all students to ensure progression in the course. The second feedback process was provided as needed, meaning that if a student designs his or her own pathway with due dates that differ from those of the initial course assignments, the instructors provided feedback according to the learner's needs. The designer included this process in the course to support personalized feedback for every learner and allowed learners to tweak the course content, due dates, assignments, and projects. Personalized

peer feedback was another aspect of the course; learners were grouped by learning pathway and obtain more personalized peer feedback. In this process, learners provided feedback to other learners on the same pathway.

Personalized Learning Reflection

A part of implementing these principles in the course design was to enhance students' metacognitive skills and allow them to think about their learning (Butler, 2002). At the beginning of the course, students were asked to state their learning needs, interests, and personal goals and the knowledge and skills they hoped to gain by the end of the course. Students were asked the following: "Reflect on your interests and your own goals for this course. What are some knowledge or skills you hope to gain in this course?" At the end of the course, students were asked to think about those needs, interests, personal goals, and skills, and whether they had achieved them within the course format. Students were asked the following: "Thinking back to your goals from our week 1 discussion, do you feel you succeeded in meeting those goals? How did the course format assist with this process? Do you feel that how you learned and what you learned align with your goals?"

Personalized Learning Course Format

This personalized e-learning course provided different format for the purpose of including all students' interests and learning needs within one course. The course format was as follow:

> This course was designed to provide you with the most relevant learning
> experience for meeting your goals, interests, and needs. Feedback from the
> previous course offerings indicated that this course should be redesigned to meet
> students' needs and interests by tailoring the content to their current or potential
> career goals. Therefore, the main goal of this course's redesign was to provide a

personalized learning experience that caters to students' career interests and provides an engaging and motivating learning experience.

This course provides three personalized learning pathways: K–12, higher education, and corporate training. Please select the learning pathway that best suits your learning interests. For example, if your career is in a K–12 setting or you are thinking of joining that field, you may find the K–12 pathway more helpful and personalized to your needs than one-sized-fits all content. Each learning pathway includes personalized readings, videos, case studies, and discussion prompts that are relevant to the career interests of that pathway.

- You need to select one pathway. The pathway you choose will be tailored to your interests.

- All required and optional readings are provided for the learning pathways; however, you can find and implement other readings (e.g., chapters and articles) that assist you in meeting your personal goals and interests. You should cite these readings in your discussion posts.

- Although you each will have different pathways, we will all meet in the discussion forums and discuss a variety of common topics and issues.

- The Web-Enhanced Lesson assignment can be modified if you would like to personalize it to meet your interests. Specifically, you can tailor the Web-Enhanced Lesson assignment to your career setting and goals. Note: If you decide to plan a modified Web-Enhanced Lesson assignment, you must (a) align your modified assignment with the course objectives (see syllabus) and (b) submit a plan for modifying the lessons using the template provided (see assignment folder). Please submit this assignment plan to your instructor by the end of week 2 for approval. Do not begin the assignment until you receive feedback on your assignment plan.

Chapter Summary

This chapter included a literature review of personalized learning, self-determination theory, and learning engagement within online learning environments. Prior researchers have confirmed the effect of many learning strategies (e.g., learning choices, learning interests, effective communication, and task differentiation) on students' feeling of autonomy, competence, and relatedness. The present researcher implemented personalized learning principles to provide students with learning pathways (e.g., tracks) that are designed in online learning course that was personalized, relevant, and flexible. The researcher investigated this

environment to reveal its effect on students' motivation and online learning engagement. The researcher structured the online learning course to provide learning choices, enhance learning interests, support students' perceptions of their psychological basic needs (autonomy, competence, and relatedness), and engage students to learn better. Many scholars have associated motivation in online learning with engagement (Dixson, 2010, 2015; Kim & Frick, 2011; Kuo, Walker, Belland, Schroder, & Kuo, 2014; Yoo & Huang, 2013). Therefore, the researcher studied self-determination and its relation to students' intrinsic motivation and engagement simultaneously to reveal the possible effects of personalized learning on these two variables. The researcher used SDT as the self-determination lens to investigate graduate students' self-determination and its relation to their intrinsic motivation through the three psychological basic needs (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000). The researcher also used behavioral engagement and affective engagement factors to investigate students' online learning engagement during their enrollment in personalized learning courses (Dixson, 2010, 2015; Kuh, 2003; Kuo et al., 2014).

CHAPTER 3: METHODOLOGY

Introduction

This study applied a convergent parallel mixed methods design to investigate the effect of personalized learning as an instructional approach on graduate students' self-determination, intrinsic motivation, and online learning engagement. The subjects of this study were online students who enrolled in an online graduate program at a large Midwestern university. The study was conducted during the 2018–19 academic year. Quantitative research using a quasi-experimental design, including self-reporting questionnaires, was applied to investigate the effect of personalized learning as an instructional approach to support graduate students' self-determination, intrinsic motivation, increase online learning engagement, increase students' positive online learning experiences, and positive perceptions toward online instructors.

The study also applied a qualitative research design to investigate the perceptions and experiences of the sample from the quantitative phase, including participants from both the control and experimental groups, by applying an in-depth interview protocol to examine how a personalized e-learning course contributed to the students' self-determination (autonomy, competence, and relatedness), intrinsic motivation, online learning engagement, and online learning experiences compared with students' experiences and perception in a "one-size-fits-all" course.

Mixed Methods Research Design

This mixed methods approach consisted of a quasi-experimental and qualitative research design to explore the effect of personalized learning on graduate students' self-determination and its relation to intrinsic motivation, using self-determination theory perspectives (i.e., autonomy,

competence, and relatedness) to understand how students feel when enrolled in a course designed to enhance their learning choices, interests, needs, and preferences and treat them as adult learners who can select their own and preferred tasks (Deci & Ryan, 1985: Deci & Ryan, 2000; Ryan & Deci, 2000). Online learning engagement was examined through behavioral and affective engagement (Kuh, 2003; Handelsman et al., 2005; Dixson, 2010, 2015). Both quantitative and qualitative methods were prioritized equally to answer the research questions and determine accurate results that could contribute to understanding the effect of personalized learning in the online learning environment.

Creswell and Plano Clark (2011) defined convergent parallel mixed methods as the approach that "occurs when the researcher uses concurrent timing to implement the quantitative and qualitative strands during the same phase of the research process, prioritizes the methods equally, and keeps the strands independent during analysis and then mixes the results during the overall interpretation" (pp. 70–71). This method is an efficient design which allows the researcher to collect and analyze both quantitative and qualitative data concurrently and separately (Creswell, 2014; Creswell & Plano Clark, 2011). It also treats both quantitative and qualitative data as equally important and valuable for obtaining well-validated findings for the research questions (Creswell & Plano Clark, 2011). Another strength of this approach is the independence of the studies during the data collection and analysis, followed by mixing the findings through triangulation to provide better interpretations that explain the research problem. In addition, the convergent parallel mixed methods approach can be used to illustrate the quantitative results through qualitative data, especially when the study is intended to explain and provide an in-depth understanding of the research problem. Combining the quantitative and qualitative analyses provides insights, perspectives, and a broader understanding of the research

problem (Creswell, 2014; Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). The quantitative findings provided answers to the statistical effect of personalized learning on students' self-determination and online learning engagement and its relation to intrinsic motivation. The statistical analyses included inferences findings, trends and individual differences, and relationships and correlations among the variables (Creswell, 2014; Creswell & Plano Clark, 2011). The qualitative data provided personal experiences, perceptions, and insights to help understand and explain the quantitative findings (Creswell, 2014).

  The quasi-experimental design was selected to examine the variables of this study. The most critical assumption of true experimental design is the randomization of the participants. However, in some research cases (e.g., classrooms), it is hard or inappropriate to achieve this randomization. Hence, the quasi-experimental design helps compensate for the lack of a randomized sample (Isaac & Michael, 1971; Creswell, 2013; Campbell & Stanley, 2015). A quasi-experimental design feasibly eliminates the time and resource constraints required to conduct a true experimental design. It can provide real and authentic research results because the participants sometimes react differently to the research environment (Isaac & Michael, 1971; Creswell, 2013; Campbell & Stanley, 2015). In a quasi-experimental design, the participants are always not assigned to a research environment. In addition, the quasi-experimental design provides the opportunity to investigate trends that emerge in social science research. Another important benefit of the quasi-experimental design is the identification of potential threats to validity, which is crucial to the design's group comparison (experimental and control). This design accounts for the effect of other variables on the groups; in other words, the control of those variables increases the validity (Isaac & Michael, 1971; Creswell, 2013; Campbell & Stanley, 2015; Bordens & Abbott, 2002; Bernard & Bernard, 2012). Moreover, a true

experimental design does not always represent the real context. In these cases, the external validity increases when a tight variable control occurs in a quasi-experimental design. Finally, a true experimental design may create different variations in the research, and bias can occur even when the external and internal validity are proved (Isaac & Michael, 1971; Creswell, 2013; Campbell & Stanley, 2015; Bordens & Abbott, 2002; Bernard & Bernard, 2012).

Qualitative data was collected along with quantitative data to answer the questions of "Why?" and "How?" (Roberts, 2010). The incorporation of the qualitative data allowed the researcher to investigate students' perceptions and experiences during their enrollment in the courses and explain and illustrate the quantitative findings. Applying qualitative design can permit the use of multiple sources of evidence, which results in methods and analysis triangulation. Both triangulation types support the validity and reliability of the research (Creswell, 2013; Creswell, 2014; Creswell & Plano Clark, 2011). Roberts (2010) stated that qualitative research relies on "the philosophical orientation called phenomenology, which focuses on people's experience from their perspective" (p. 143). The semi-structured interview was applied to ask students about their perceptions of their experiences of personalized learning as an instructional approach. This qualitative data validated and explained the quantitative results in this study.

Figure 3.1 shows how convergent parallel mixed methods were designed and applied in this study to investigate the research problem. Each design—quantitative and qualitative—will be discussed in detail in this chapter.

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                    │   Convergent Parallel    │
                    │  Mixed-Methods Approach   │
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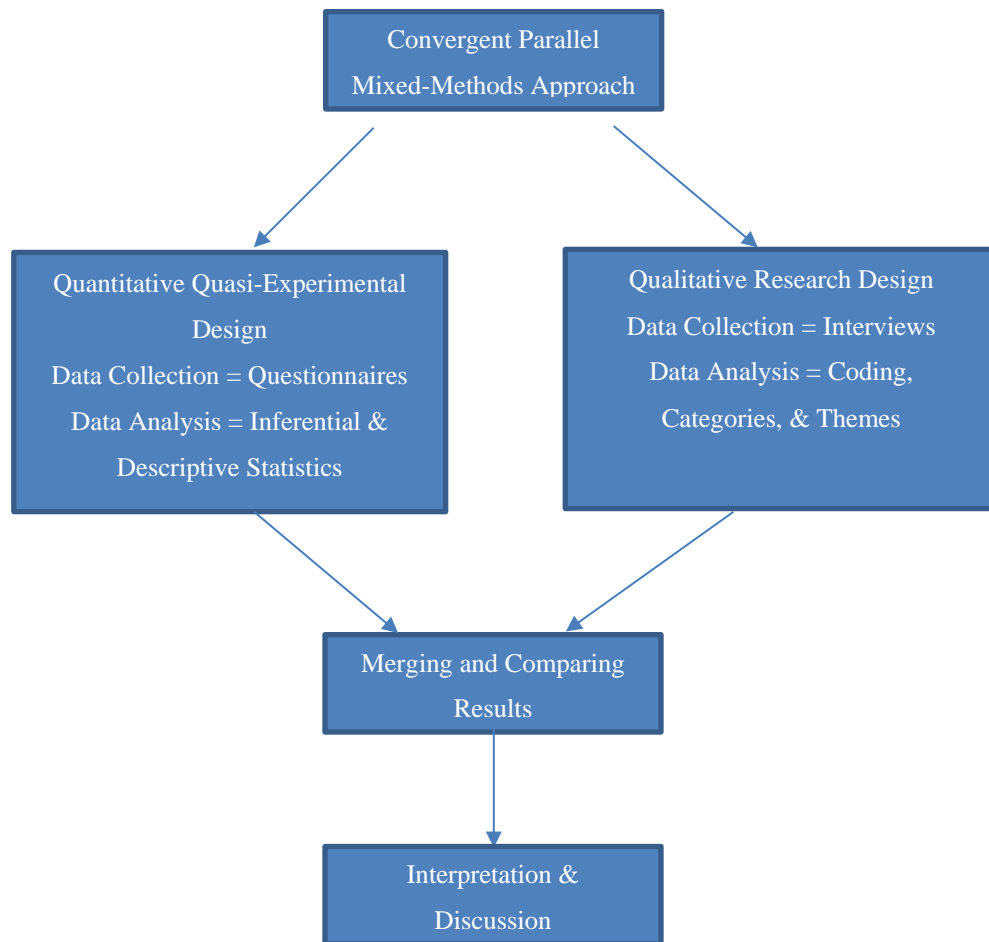
Figure 3. 1 Convergent Parallel Mixed-Methods Approach: Quantitative and Qualitative Designs
for Data Collected and Analyzed.

Research Questions and Hypotheses

The research questions were mainly focused on investigating the effect of personalized

learning as an instructional approach on students' self-determination, intrinsic motivation, and

online learning engagement. The study began with an examination of the overall effectiveness of

the personalized learning approach to student learning within the online learning courses. Hence,

the study investigated the effect of the personalized learning approach on students' self-determination perspectives, which include their autonomy, competence, and relatedness. The study also investigated the same independent variable's (personalized learning approach) effect on students' online learning engagement to measure whether this approach can better engage students and deepen their understanding of the course content, activities, and assessments. A qualitative research question was included to obtain a deeper understanding of the quantitative findings. Using the convergent parallel mixed methods design allowed this study to answer the following research questions concurrently and separately:

1. What is the effect of personalized learning as an instructional approach on graduate students' self-determination and intrinsic motivation to learn?

2. What is the effect of personalized learning as an instructional approach on graduate students' online learning engagement?

3. How did graduate students' experiences differ between an online course with a one-size-fits-all approach and an online course with a personalized learning approach?

Self-Determination Theory Hypotheses

- $H_{0,1}$: Personalized learning as instructional approach will have no statistically significant effect on students' perceived feelings of autonomy.

- $H_{0,2}$: The intervention will have no statistically significant effect on students' perceived feelings of competence.

- $H_{0,3}$: The intervention will have no statistically significant effect on students' perceived feelings of relatedness.

Engagement Hypotheses

- $H_{0,4}$: Personalized learning as instructional approach will not statistically

  significant increase students' skills, emotion, participation, and performance

  engagement.

Online Learning Experience Hypotheses

- $H_{0,5}$: There will be no statistically significant difference between students'

  learning experiences in the personalized online learning course compared with

  students' learning experiences in the one-size-fits-all course.

- $H_{0,6}$: There will be no statistically significant difference between students'

  experiences with their instructors in the personalized online learning course

  compared with students' experiences in the one-size-fits-all course.

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Quasi-Experimental Design

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A quasi-experimental design was considered for this study as the quantitative design to examine the significant effect of personalized learning as an instructional approach implemented in online learning courses. The quasi-experimental design consisted of a pretest, posttest, and control group. This design was selected over a true experimental design due to the lack of randomization when assigning samples to the experimental and control groups and due to its valid measurement of the intervention effect on the outcome variables (Cooper & Schindler, 2003; Creswell, 2002). The chosen method allows for investigating the effect of the independent variable on the dependent variables (outcomes) within the targeted population.

Specifically, the quasi-experimental design was used to determine the effect of the independent variable (using personalized learning as an instructional approach in an online

learning course) on the dependent variables (students' self-determination (autonomy feeling, competence feeling, and relatedness feeling), intrinsic motivation, and online learning engagement). The method was also used to determine the effect of the same independent variable on increasing students' positive online learning experiences, and increase positive perceptions toward online instructors as the students experienced different instructional methods of learning. To ensure the validity and reliability of this research design, the study included demographics and pretest variables to control for variation in the findings and implications.

Settings and Participants

This study was conducted in the context of a distance learning program at a large Midwestern university. It utilized an online course to implement a personalized learning instructional approach to provide the opportunity for all students to design and follow their own pathways that could lead to personalized content and assignments tailored to their learning needs. The participants of this study were the graduate students enrolled in six sections of an online course offered every semester. All participants were instructional designers enrolled in learning design and technology master programs.

The four experimental groups were sampled during the fall and spring semesters of 2018–19, with a total of 40 students (n = 40). The experimental groups received a personalized e-learning course designed to be flexible and to provide more choices and task selections for every student—the opposite of the one-size-fits-all course design (See Figure 2.2 and 2.3). The course allowed students to select their own personalized pathways that determines the readings, activities, assignments, assessment plans, and final projects that would meet their learning needs and interests. The course was designed with three different pathways that addressed the content of the course within grades K–12, higher education, and corporate training, as well as allowing

students to develop their own personalized pathways that could combine these pathways in any way. In addition, the course allowed students to develop a consultation pathway that could address their own interests and needs if they were interested in consultation jobs. Students were asked to determine and select their learning pathways at the beginning of the course. They were guided to choose what was most suitable for their learning needs and interests. The course introduced and the syllabus included all elements that students should know about their personalization options. They were informed that the course was designed to enhance their choices, interests, and needs to better engage them in the online learning environment.

The control group was sampled during the spring semester of 2018 with 24 students (n = 24). The control group was enrolled in two course sections and received a one-size-fits-all course design and delivery. This design only included content and assignments that addressed K–12 settings. Students were not given the choices those in the experimental group received. The course had predetermined assessment plans and readings and less interactive activities. The course had one textbook that was assigned as the main reading for all students. Additional readings were optional and focused on K–12 settings. This course was not designed intentionally to provide one perspective of the topic, but rather the design existed and had been provided for several years without considering students' different backgrounds, interests, and learning needs.

Sampling Procedures

A quasi-experimental design was selected to compare the experimental group that received the intervention (in the personalized e-learning course) with the control group (in the traditional, one-size-fits-all online course), including the consideration of variations that may have affected the external validity of the research. Without utilizing simple random sampling (SRS), the study investigated the effect of the independent variable (the personalized learning

approach) on the dependent variables (students' motivation and online learning engagement).

Instead, convenience sampling was determined for two reasons. First, the researcher had no

control over assigning online students into the course sections, which problematized a true

experimental design. Hence, it would have been difficult to utilize random sampling within

online courses. Second, convenience sampling was employed due to the geographical

accessibility of the online program. Gall, Borg, & Gall (2003) stated that convenience sampling

is used to "select the sample that suits the purposes of the study and that is convenient" (p. 175).

Therefore, this study employed the convenience sampling method with a non-randomized,

controlled trial.

The data collection took place at different times. The control groups' data were collected

during the spring 2018 semester. All participants were enrolled in the online course and could

decline their participation at any time. The experimental groups' data was collected during the

fall and spring semesters of the 2018–19 academic year for the purpose of collecting data from a

larger sample size as well as continuing to improve the course design. The Qualtrics system was

used to collect the survey data, which was used for the purpose of this study only.

Sample Size and Power

The study sample consisted of (n = 40) graduate students in the experimental groups (9

male and 31 female) and (n = 26) graduate students in the control groups (5 male and 19 female)

(See Table 3.1). All participants majored in learning design and technology, and all were

enrolled in the masters' program. Within the experimental and control groups, most of the

participants aged between 25–35 (37, 57.8%) (See Table 3.2). The experimental groups

participants' previous online learning experience average was (M = 3.65), and the control group

average was (M = 3.54). Moreover, both participants in the experimental groups (M = 3.63) and

the control group (M = 3.75) held "very good" educational technology proficiency. Although a

larger sample size would have increased the power of the study, online courses generally tend to

include smaller course sizes, which limited this study to only include a total of (N = 64)

participants. The study, therefore, investigated the effect of a personalized learning approach on

four experimental sections of an online course and two controlled sections of the same course

online course.

Table 3. 1 Participants' Gender

Gender			
	Gender	Frequency	Percent
Personalized Course (experimental group)	Male	9	22.5%
	Female	31	77.5%
One-size-fits-all course (control groups)	Male	5	20.8%
	Female	19	79.2%

Table 3. 2 Participants' Age

Age			
		Frequency	Percent
Age category	18–24	3	4.7
	25–35	37	57.8
	36–45	14	21.9
	46–55	7	10.9
	56 or older	3	4.7
	Total	64	100

Instrumentation

The self-reported pretest instruments consisted of demographic items, the Basic

Psychological Need Satisfaction (BPNS) scale (Deci & Ryan, 2000; Deci et al., 2001; Gagné,

2003), and the online students' engagement (OSE) scale (Dixson, 2010, 2015). The pretest was

conducted before course instruction. Participants were asked to report their perceptions regarding

their current basic psychological needs and online learning engagement (based on their previous

experiences with online courses). The posttest consisted of the above scales and items as well as

the personalized learning items. These items were constructed to score students' perceptions of

their experiences with the online personalized learning approach.

Demographics

Based on previous distance education literature, the demographics items were developed

to capture students' previous experiences as well as their perceptions of their learning and

engagement. Accordingly, the following items were included for demographic purposes: gender,

age, previous online experience, time spent studying for the course, experience with the course

instructor, and educational technology proficiency.

Personalized learning items. The researcher developed personalized learning items to capture students' perceptions of their experiences with the personalized learning as instructional approach in online learning courses. Hence, the items were developed based on the personalization principles in the current literature (Watson & Watson, 2017; Rickabaugh, 2012; Lessor, 2016; Redding, 2014b). The items were aligned with the course design elements to allow students to report their opinions regarding their experiences of the approach. The items were reviewed by two experts to ensure the items align with the personalized learning principles as well as the clarity of the items.

BPNS

The BPNS scale has been widely used in numerous studies in different fields including education. It was developed by Deci and Ryan (2000) to measure the extent to which the participant experienced and perceived satisfaction of general, basic human needs. For this study, the scale was used to measure students' innate needs proposed by the self-determination theory (SDT). The students' three basic needs were autonomy, competence, and relatedness. The scale consisted of 21 7-Likert scale items developed to capture basic human needs. It consisted of three subscales as well. Hence, each subscale generated a score that can be used to interpret the participants' basic needs. For this study, the scale was considered to understand online students' perceptions of their basic needs and intrinsic motivation when enrolled in a personalized e-learning course. The main goal of utilizing this scale was to examine whether the personalized learning approach could satisfy students' basic needs for autonomy, competence, and relatedness (Deci et al., 2001).

This scale was scored from (1–7), where (7) represents "very true", (4) somewhat true, and (1) to "true at all". Some of the items needed to be reversed because they were negatively worded (Appendix C).

OSE

The OSE scale—a modified version of the Student Course Engagement Questionnaire (SCEQ)—was constructed of four factors: skills engagement, emotional engagement, participation engagement, and performance engagement (Handelsman, Briggs, Sullivan, & Towler, 2005). The original SCEQ scale has 23 items that measure student course engagement in general. The OSE scale was constructed based on the original scale and features 19 items on a 5-Likert scale that measure online student engagement. The scale focuses on both behavioral and affective engagement. Dixson (2010) stated that the OSE scale was developed to measure student engagement in online courses. For this study, the OSE scale was used to measure online student engagement in a personalized e-learning course and in the one-size-fits-all course. In other words, the scale was administered for both the control and experimental groups during the pretest and posttest sampling.

Validation and Reliability

The instruments used in this study consist of a personalized learning items, the BPNS scale, and the OSE scale. The personalized learning survey items were developed based on the personalized learning principles to capture students' perceptions and experiences of this approach in online learning. The personalized learning instrument was tested for reliability using coefficient alpha measures ($\alpha = 0.86$). The BPNS and OSE have been validated (Deci et al., 2001; Dixson, 2010; 2015). Author permissions were obtained to use and modify some of the

items to the context of this study. Specifically, the BPNS was modified only as recommended by Deci et al. (2001). The reliability of the BPNS was consistent with previous research findings (Deci & Ryan, 2000; Deci et al., 2001; Dixson, 2015). The BPNS scale has been already validated and tested in many settings, and many studies have reported significant validity and reliability of the three subscales (competence, autonomy, and relatedness) as well as the overall scale. Deci et al. (2001) reported the alpha reliability of competence (α = .79), autonomy (α = .73), and relatedness (α = .84), and Rowe, Walker, Britton, and Hirsch (2013) found the overall consistency of this scale (α = .89). Gagné (2003) and Thorgersen–Ntoumani, Ntoumanis, Cumming, and Chatzisarantis (2011) used and validated this scale as well. Constructs validity were also reported by Gagné (2003) and Kashdan, Julian, Merritt, and Uswatte (2006).

The OSE was modified and investigated by Dixson (2015) and reported strong reliability of alpha (α = .91). Dixson (2015) also conducted confirmatory factor analysis and concluded that this scale is a valid and reliable to measure student engagement in online learning, which consists of four constructs (skills engagement, participation engagement, emotional engagement, and performance engagement).

Independent vs. Dependent Variables

The personalized online learning course and the one-size-fits all course were applied as the independent variable in this study (Intervention 1/0). Both SDT and online learning engagement scales were used to measure the dependent variables. Creswell (2003) stated that independent variables change the dependent or outcome variables due to causation, influence, or effect. They are sometimes identified as treatment, predictor, antecedent, and manipulator variables. Dependent variables are those that change based on the impact of the independent variables. Creswell (2003) described these variables as "the outcomes or results of the influence

of the independent variables" (p. 94). In this study, the BPNS provided scores for the three

perspective scores (perceived feelings of autonomy, competence, and relatedness), which were

examined as dependent variables to measure the effect of the intervention on students' self-

determination.

The OSE scale was used to investigate students' engagement within the online

environment. Four subscales (skills engagement, participation engagement, emotional

engagement, and performance engagement) were used to score students' engagement in the

personalized online learning course and the one-size-fits-all course. These scores were treated as

dependent scores to measure students' engagement in online courses. Finally, demographic

factors were investigated as the independent variables to test the differences and variability

among learners in both groups.

Quantitative Data Analysis

The experimental group was compared with the control group to investigate the statistical

differences between these two groups and inform this study on the effect of personalized learning

as an instructional approach in the online learning environment. The analysis of the quantitative

data was guided by the study's hypotheses to better address the research questions. Statistical

Package for Social Science (SPSS) was used as the software for analyzing the statistical models

in this study. The following sections will discuss the specific strategies and statistical models

applied to examine the quantitative data in this study.

Descriptive analysis

Descriptive data was collected to investigate the participants' genders, ages, previous

online learning experiences, and educational technology proficiency. The descriptive statistics

also were applied to describe students' perceptions and experiences with personalized learning as instructional approach.

Inferential statistics

Inferential statistical models were utilized to test the hypotheses and investigate the effect of the independent variable on the dependent variables (Creswell, 2002; Cooper & Schindler, 2003). General linear models (GLM) were analyzed to reveal the effect of a personalized learning approach on students' self-determination, online learning engagement, and online learning experiences between the experimental and control groups (Isaac & Michael, 1997). The purpose of conducting this analysis was to set the pretests of each variable as the covariate (ANCOVA) to provide accurate adjusted posttest estimates to compare between the groups and identify the effects of personalized learning as an instructional approach on graduate students' self-determination and engagement (Isaac & Michael, 1997). In addition, independent sample t-test was performed to test the posttest differences between the two groups in online learning experiences and students' perceptions of the course instructors.

Qualitative Research Design

A qualitative research design was applied in this study via an in-depth interview protocol to examine students' experiences and perceptions of personalized learning as an instructional approach to obtain a deeper understanding of the quantitative results (Patton, 2015; Creswell, 2013). In a personalized learning environment, every learner experienced the approach differently. A personalized learning approach allowed students to select and decide their learning. The design and implementation of personalized learning as the instructional approach

in an online course was intended to enhance students' self-determination and engagement as well as provide them with different methods of learning that could enhance their learning.

Participants

The study included four participants from the one-size-fits-all course and six participants from the personalized e-learning course to compare their responses (See Table 3.3). The interviews were conducted with participants from all course sections. The findings that emerged from the qualitative data (themes) from the one-size-fits-all course were compared with the findings (themes) that emerged from the personalized e-learning course. The qualitative data collection addressed the participants' perceptions and experiences of their enrollment in the course. The participants were informed that their participation in the interviews were a volunteering task and would not affect their course grades.

Table 3. 3 Demographics of Interview Participants

Pseudonym	Group	Learning Interests	Current Job	Future Job
Sara	One-Size-Fits-All Course	Corporate Training Pathway	Corporate Trainer	Instructional Designer in Global Corporate
Katherine	One-Size-Fits-All Course	Corporate Training Pathway	Technology Trainer	Learning Technology Trainer
Emily	One-Size-Fits-All Course	Higher Education Pathway	Faculty Member in a College	Faculty Member in a College
Kim	One-Size-Fits-All Course	Higher Education and K–12 Pathways	Media Instructional Technology Specialist	Instructional Designer within the Context of Agriculture
Emma	Personalized Course	Higher Education Pathway	English as Second Language Instructor	English as Second Language Instructor
Amelia	Personalized Course	Higher Education Pathway	Instructional Designer	Instructional Designer
Maya	Personalized Course	Corporate Training Pathway	Trainer/Instructional Designer in the Corporate	Instructional Designer for a Consulting Firm
Jessica	Personalized Course	Corporate Training Pathway	Trainer/Instructional Designer in the Corporate	Instructional Designer for a Non-profit Organizations
David	Personalized Course	Corporate Training Pathway	Learning and Development Specialist	Instructional Designer and Instructor in the Industry
Lisa	Personalized Course	Corporate Training Pathway	Learning, Development, and Training Specialist	Instructional Designer and in the Industry

Data Collection Procedures

At the final week of the course, the participants were invited to participate in semi-structured interviews to obtain their perceptions of their intrinsic motivation and online learning engagement during their enrollment in the one-size-fits-all course and the personalized e-learning course. All enrolled students were given the chance to share their experiences. A semi-structured interview protocol was used to interview the participants, including SDT, engagement, and personalized learning terms and definitions to ensure the participants understood the protocol content. During the interview, the researcher introduced the participants to the research topic, objectives, terms, and definitions. The interviews were conducted via multiple mediums, including phone or WebEx. The interviews were audiotaped and transcribed verbatim. Each interview lasted approximately 20–60 minutes.

Data Sources

A semi-structured interview protocol was the main data source to examine students' perceptions, insights, and learning experiences within the implementation of the personalized learning approach. Because the purpose of the study was to investigate the course's impact on students' self-determination, intrinsic motivation, and engagement, these interviews served as an effective instrument to understand how students interpreted their experiences of the personalized learning approach within the online learning context (Creswell & Plano Clark, 2011; Patton, 2015; Creswell, 2013). The development of the protocol was based on SDT (Deci & Rayn, 1985; Deci & Rayn, 2000; Deci et al., 2001), engagement in online learning (Dixson, 2010, 2015), and personalized learning principles (Appendix B). The interview protocol included open-ended questions that allowed participants to share their thoughts and experiences regarding the approach (Edwards & Holland, 2013). The protocol also included a self-introduction; a

description of students' approach to learning; the purpose of enrolling in the course; the student's

motivation, participation, and level of engagement; positive and negative aspects of the course;

and perceptions of course success. Moreover, the protocol featured intrinsic motivation prompts

and questions using SDT (i.e., feelings of autonomy, competence, and relatedness). Before

conducting interviews, experts in motivation, engagement, and personalized learning were

invited to review the protocol questions and prompts to address any issues in the development

process. Three volunteering experts (professors and instructional designers) participated in the

review process of this protocol. Finally, the protocol was piloted with three participants to record

time and any issues that could affect the actual interviews.

Data Analysis

The researcher followed qualitative procedures to analyze the interview data (Saldana,

2009; Creswell, 2013). The researcher applied thematic analysis (Boyatzis, 1998; Braun &

Clarke, 2006) to draw the themes and identify the factors that affect and support students' self-

determination, intrinsic motivation, online learning engagement, and their online learning

experiences when enrolled in a one-size-fits-all course and the personalized course.

In the first analysis stage, the researcher audiotaped and transcribed the interviews to

prepare for the coding and analysis. Multiple interview readings were conducted to deeply

understanding the participants' thoughts and concepts that emerged from the interviews. Each

interview was analyzed discretely to capture all participants' voices and thoughts using an open

coding technique to prepare the data to be categorized into themes (Boyatzis, 1998; Braun &

Clarke, 200; Creswell, 2013). Then the researcher used coding to analyze the interview data and

develop coding schemas that answer the research questions. Sentence-level coding was

conducted to identify the factors and themes. The codes were transferred to codebook in NVivo

software, which utilized to create the data pattern, theme, and frequency displays (Creswell, 2013).

In the second analysis stage, the researcher applied Saldana's (2016) three coding cycles. The first cycle was inductive coding to code and create themes that were identified by the study's framework and theories. Inductive coding was the appropriate approach to code for the research questions because the data were collected for the purpose of this study, the data relate to every research question that guided and directed this study, and the themes were not driven by the researcher's theoretical dispositions and interests. Therefore, the analysis was data driven and the codes and themes were specifically related to the research questions and the purpose of this study. Research questions guided the interview development, from which the codes and themes were identified and extracted to answer them. The second cycle of coding was conducted deductively to extract emerging themes that represent students' perceptions of their learning and experiences in the one-size-fits-all course and personalized course. The third cycle was conducted to finalize the codes, factors, and themes that were found in the first two cycles.

In the third stage, the researcher compared factors and themes between the two courses (the one-size-fits-all and personalized courses). This comparison was conducted to examine the effect of personalized learning as an instructional approach on students' self-determination, intrinsic motivation, online learning engagement, and online learning experiences. Quotes from the participants' interviews from both courses were included in the analysis to support the validity and dependability of the findings. Finally, the qualitative analyses were compared with quantitative results to assess whether the results from both research designs were divergent or convergent to gain a deeper understanding of the study's problem (Creswell & Plano Clark, 2011).

Reliability and Validity

Qualitative researchers need to consider several steps to ensure their studies' internal validity and reliability (Polit & Beck, 2010; Shenton, 2004; Creswell, 2013). The internal validity concept is the approximate truth about the results of the relationships and cause–effect studies. Internal validity requires the investigation of the effects and relationships among the variables or research claims, though it is not required in observational studies. Because the purpose of this study was to investigate the effect of the personalized learning approach on students' self-determination, intrinsic motivation, and engagement, it required internal validity. Therefore, the research considered the strategies recommended in the literature (Polit & Beck, 2010; Onwuegbuzie & Leech, 2007). The study followed multiple procedures to achieve internal validity, including data triangulation, member checking, NVivo software database creation, and pilot testing. The study also followed reliability procedures to ensure the consistency of the interview findings. The reliability procedures included a semi-structured interview protocol (See Appendix B) and interrater reliability. For the dependability of the study, the researcher considered all interview transcripts verbatim, including the positive and negative findings or concepts regarding students' perceptions of both the personalized learning course and one-size-fits-all course.

Role of the Researcher and Ethical Considerations

In qualitative research, the researcher can be the primary data collection instrument. Therefore, it is highly likely that the researcher's theoretical dispositions, previous experience, personal values, assumptions, and biases can impact the research interpretations. The researcher held a theoretical disposition toward the learner-centered paradigm and personalized learning approach. This disposition was guided by the researcher's belief that this approach can

significantly increase learners' motivation and engagement. However, the fact that the researcher did not previously know the participants minimized the research bias, especially given that participants with various levels of experience were invited from an online learning program (Creswell, 2013). Further, the research followed multiple procedures to ensure the study's validity, reliability, and dependability as well as avoid such research bias. The researcher reduced the biases that can subjectively impact the research interpretations by including participants' quotations (Polit & Beck, 2010; Shenton, 2004; Creswell, 2013). The researcher focused on the participants' perceptions to present valid interpretations that explain findings from the quantitative design in this study. This study also included questionnaires and interview protocol that were driven by the SDT and online learning engagement framework to collect different data types to ensure its credibility, which are additional steps to minimize the impact of the researcher's biased perceptions and personal experiences on the study's findings and interpretations. Finally, Institutional Review Board (IRB) approval was obtained before conducting the research process (See Appendix A).

Methods Limitations

Every method has its own limitations that can challenge the validity and reliability of any study. In this study, the lack of sample randomization was a limiting factor to the findings' generalizability. As a result, a quasi-experimental design was applied to overcome this limitation. As indicated, this study utilized a control group design to ensure the internal validity of the research. The course sections were formed when students registered electronically, and the researcher did not have control over assigning students into sections. Therefore, random selection was a limitation of this study. An external threat to the validity of this study was the interaction of intervention, selection, and settings (Creswell, 2009). This threat may prevent the

generalization of the findings, which could lead generalizability only to the same settings this study investigated (online learning). In addition, generalizing only may occur for students who hold the same characteristics as those who included in this study. Another limitation was the sample size because it could have been challenging to examine all the variables that could have been included in this study. However, the study's setting was an online learning environment, which included less than 15 students in each section.

Applying a qualitative method design can limit the generalization of the findings and "cannot be extended to wider populations with the same degree of certainty that quantitative analyses can" (Atieno, 2009, p. 17). However, a convergent parallel mixed methods design was applied to investigate both quantitative and qualitative data simultaneously to validate the findings and better provide for the application of these findings to wider populations.

Chapter Summary

The purpose of this chapter was to introduce and discuss the methodology used in this study. The chapter was organized to introduce the mixed methods process, followed by quantitative research design and qualitative research design sections to discuss the methods thoroughly. Four course sections of online graduate students participated in the experimental groups, and two sections participated in the control group. The study used a convergent parallel mixed methods approach to collect both quantitative and qualitative data and conduct data analysis separately and concurrently (Creswell, 2014; Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009).

This quasi-experimental design (i.e., pretest, posttest, and control groups) study investigated the statistical effect of personalized learning as an instructional approach on graduate students' intrinsic motivation via SDT perspectives (autonomy, competence, and

relatedness). The study also investigated the effect of personalized learning approach on students' online learning engagement and online learning experiences. This research design investigated the effect of the intervention when there was a lack of participant randomization.

A qualitative research design using a semi-structured interview protocol was used to collect and analyze qualitative data. The study included four participants from the one-size-fits-all course and six participants from the personalized e-learning course to compare their responses. Thematic analysis was conducted to find themes and factors from both courses—the one-size-fits-all course and the personalized course. The purpose of collecting qualitative data was to deeply explain students' experiences and perceptions of their learning in these two courses and reveal whether the personalized course increased and supported students' self-determination, intrinsic motivation, and online learning engagement (Creswell & Plano Clark, 2011).

CHAPTER 4: RESULTS

Introduction

This chapter presents the quantitative and qualitative findings of this study. Quantitative data were collected using self-reported questionnaires, and qualitative data were collected using semi-structured interviews with ten participants—four from the one-size-fits-all course and six participants from the personalized e-learning course. General linear modeling (GLM) and independent sample t-tests were conducted to analyze the quantitative data, and thematic analysis was conducted to evaluate the interview data. The main purpose of this study was to examine the effects of the personalized learning as instructional approach on students' self-determination using the three SDT perspectives—feelings of autonomy, competence, and relatedness (Deci & Ryan, 2000)—and their relation to intrinsic motivation. The study also intended to examine graduate students' online learning engagement by providing them with an online course that tailors learning toward personal goals, learning needs, and interests.

1. **What is the effect of personalized learning as an instructional approach on graduate students' self-determination and intrinsic motivation to learn?**

The researcher applied SDT to guide the research procedures for investigating students' self-determination and intrinsic motivation (Deci, Ryan, & Williams, 1996). The researcher intended to investigate the effect of personalized learning as an instructional approach on graduate students' self-determination (feelings of autonomy, competence, and relatedness) and intrinsic motivation. The researcher applied the BPNS scale (Deci et al., 2001) to measure these variables quantitatively. GLM was conducted to reveal the effect of this approach on students' self-determination. An independent sample t-test was performed to test the posttest differences

between the two groups. Then the researcher followed the survey procedures with interviews with ten participants to collect qualitative data and applied thematic analysis to explain and reveal the themes and factors that supported students' self-determination and intrinsic motivation during their course experiences.

SDT Quantitative Results

Autonomy. The first SDT hypothesis stated: personalized learning as instructional approach will have no statistically significant effect on students' perceived feelings of autonomy. An ANCOVA was performed to determine the effect of personalized learning as an instructional approach on students' feeling of autonomy after controlling for the pretest. The pretest of autonomy score was used as the covariate variable in the model to adjust the mean (Isaac & Michael, 1997). One-way ANCOVA assumptions were tested. There was a linear relationship between pre- and post-intervention, as assessed by visual inspection of a scatterplot. There was homogeneity of regression slopes as the interaction term was not statistically significant, F (1, 60) = 3.092, p = .084. Standardized residuals for the interventions were normally distributed, as assessed by Shapiro-Wilk's test (p > .05). There was homoscedasticity, as assessed by visual inspection of the standardized residuals plotted against the predicted values. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. After adjustment for the pretest of perceived feeling of autonomy, there was a statistically significant difference in the posttest between the groups on students' autonomy for the intervention group (personalized course), F (1, 61) = 4.577, p = .036, partial $\eta2$ = .070. The p *value* (< 0.05) indicated the rejection of the null hypothesis, which means that personalized learning as instructional approach has a statistically significant effect on students' perceived feelings of autonomy. This result indicates that the intervention had an effect on increasing

students' feeling of autonomy. Table 4.1 shows the adjusted and unadjusted means for the perceived feeling of autonomy.

Table 4. 1 *Adjusted and Unadjusted Means and Variability for Students' Perceived Feeling of Autonomy*

	Unadjusted			Adjusted	
	N	M	SD	M	SE
PL course	40	5.6071	.60067	5.437[a]	.117
One-size-fits-all course	24	4.7202	1.17386	5.005[a]	.154
*Covariates appearing in the model are evaluated at the following values: Pretest = 4.9576.					

Competence. The second SDT hypothesis states: the intervention will have no statistically significant effect on students' perceived feelings of competence. An ANCOVA was performed to determine the effect of personalized learning as an instructional approach on students' feeling of competence after controlling for the pretest. The pretest of competence score was used as the covariate variable in the model to adjust the mean (Isaac & Michael, 1997). One-way ANCOVA assumptions were tested. There was a linear relationship between pre- and post-intervention, as assessed by visual inspection of a scatterplot. There was homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 60) = .144$, $p = .706$. Standardized residuals for the interventions were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). There was homoscedasticity, as assessed by visual inspection of the standardized residuals plotted against the predicted values. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. After adjusting for the pretest of perceived feeling of competence, there was no statistically significant difference in the posttest between the groups on students' competence, $F(1, 61) = .479$, $p = .49$.

The *p value* (> 0.05) indicated the null hypothesis could not be rejected, which means that personalized learning as an instructional approach has no statistically significant effect on students' perceived feelings of competence. Table 4.2 shows the adjusted and unadjusted means for the perceived feeling of competence.

Table 4. 2 *Adjusted and Unadjusted Means and Variability for Students' Perceived Feeling of Competence*

	Unadjusted			Adjusted	
	N	M	SD	M	SE
PL course	40	5.4958	.85941	5.302[a]	.088
One-size-fits-all course	24	4.8750	.95332	5.199[a]	.115
*Covariates appearing in the model are evaluated at the following values: Pretest = 5.3438.					

However, the posttest mean for the perceived feeling of competence has increased. These results indicated that the intervention had an effect on supporting students' feeling of competence, but the effect was not statistically significant. In addition, students from both courses (the one-size-fits-all and personalized courses) felt competent to complete the course work. An independent t-test was performed to compare the posttest of competence between the groups as well as without the pretest. The results showed a statistically significant difference between the posttest with a higher mean for the students in the personalized course (*M* = 5.495, *SD* = .8594) and the one-size-fits-all course (*M* = 4.875, *SD* = .9533); *t* (62) = 2.685 *p value* = 0.009 (See Table 4.3). These results showed that students in the personalized course felt more competent to complete the coursework than they did in the one-size-fits-all course.

Table 4. 3 *Posttest Independent Sample T-test of Perceived Feeling of Competence Between Groups*

Dependent Variable	Groups	Independent Samples t-test					
		N	M	SD	T	DF	Sig. (2-tailed)
Perceived Feeling of Competence	PL Course	40	5.495	.8594	2.685	62	0.009
	One-Size-Fits-All course	24	4.875	.9533			

Relatedness. The third SDT hypothesis stated: the intervention will have no statistically significant effect on students' perceived feelings of relatedness. An ANCOVA was performed to determine the effect of personalized learning as an instructional approach on students' feeling of relatedness after controlling for the pretest. The pretest of the relatedness score was used as the covariate variable in the model to adjust the mean. One-way ANCOVA assumptions were tested. There was a linear relationship between pre- and post-intervention, as assessed by visual inspection of a scatterplot. There was homogeneity of regression slopes as the interaction term was not statistically significant, $F (1, 60) = .934$, $p = .338$. Standardized residuals for the interventions were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). There was homoscedasticity, as assessed by visual inspection of the standardized residuals plotted against the predicted values. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. After adjusting for the pretest of perceived feeling of relatedness, there was no statistically significant difference in the posttest between the groups on students' relatedness, $F (1, 61) = .200$, $p = .65$. The *p value* (> 0.05) indicated the null hypothesis could not be rejected, which means personalized learning as an instructional approach has no statistically significant effect on students' perceived feeling of

relatedness. Table 4.4 shows the adjusted and unadjusted means for the perceived feeling of

relatedness.

Table 4. 4 *Adjusted and Unadjusted Means and Variability for Students' Perceived Feeling of Relatedness.*

	Unadjusted			Adjusted	
	N	M	SD	M	SE
PL course	40	4.8554	.74239	4.751[a]	.111
One-size-fits-all course	24	4.4948	.98734	4.669[a]	.144
*Covariates appearing in the model are evaluated at the following values: Pretest = 4.5988.					

In addition, the posttest mean for the perceived feeling of relatedness has not increased

significantly. An independent t-test was performed to compare the posttest of relatedness

between the groups as well as without the pretest. The results did not show a statistical

significant difference between the two groups posttests, personalized course ($M = 4.85$, $SD =$

.742) and the one-size-fits-all course ($M = 4.49$, $SD = .987$); $t (62) = 1.659$ $p value = 0.10$ (See

Table 4.5). These results indicated that the intervention did not have an effect on supporting

students' feeling of relatedness.

Table 4. 5 *Posttest Independent Sample T-test of Perceived Feeling of Relatedness Between*
Groups

Dependent Variable	Groups	Independent Samples t-test					
		N	M	SD	T	DF	Sig. (2-tailed)
Perceived Feeling of Relatedness	PL Course	40	4.85	.742	1.659	62	0.10
	One-Size-Fits-All course	24	4.49	.987			

SDT Qualitative Results

The first qualitative major theme in this study was the self-determination, which includes feelings of autonomy, competence, and relatedness (Deci & Ryan, 2000). The three SDT perspectives were applied as the framework and the subthemes to investigate the factors that supported students' self-determination and intrinsic motivation in both course types—the one-size-fits-all course and the personalized course (See Table 4.10). Within the major themes, subthemes were defined to analyze the factors that supported self-determination and intrinsic motivation. The subthemes (*e.g.*, feeling of autonomy and feeling of competence) and factors (*e.g.*, course project and instructor facilitation) were then compared between the two courses to reveal the effect of personalized learning as an instructional approach in online learning courses (See Table 4.10). The purpose of this comparison was to determine the factors that affected students' feelings of self-determination, intrinsic motivation, and online learning engagement and whether personalized learning as an instructional approach contributed to support those variables within online learning courses.

Autonomy

Interviewees from both courses (the one-size-fits-all and personalized courses) were asked during the interviews to report the factors that supported their feeling of autonomy during their course experiences. Findings showed that the *course project* supported students' feeling of autonomy in both courses. However, the interviewees from the one-size-fits-all course indicated that *effective facilitation from their instructors* supported their feeling of autonomy when completing the *course project assignment*. Interviewees from the personalized course indicated that the *course project* and *personalized course design* were the factors that supported their feeling of autonomy.

Course project

Students were asked to select a topic and design the project to produce a lesson that could be taught to learners. The personalized course provided students with the option to modify the assignment to meet their needs. More than half of participants from both courses reported that the design of the course project supported their feeling of autonomy. Those participants (in both courses) also indicated that the project was set up to select whatever they were interested in with flexibility to adapt the focus of the project toward their learning needs.

Course project design

The course project design included three sequential parts to allow students to progress throughout the course time with instructor feedback. The interview findings showed that the course project design was effective at supporting students' feeling of autonomy because of the design flexibility and ability to select the topic of their projects. When asked about the factors that supported feeling of autonomy, Kim said, "the ability to choose what my own project was,

as well as the flexibility," and Emily said, "the ability to customize the lessons. The main project that we were doing helps with the sense of autonomy, of the ability to pick which technology I wanted to investigate, that helped."

Instructor support

Instructors supported students individually, provided instructions that helped students feel confident, and personalized the course focus toward their needs. Therefore, participants from the one-size-fits-all course reported that they felt autonomous when instructors were flexible and supportive to their work on the course project. Sara mentioned:

> like with the big project …there were some parameters of the assignment that wouldn't exactly work for… my… team [that was focused on corporate settings] itself, but I was able to find ways to adapt both the assignment and what my team needed to meet all of those needs… [and by] reaching out to my professor.

Personalized course design

Interviewees from the personalized course indicated that the course design itself was a contributor to their feeling of autonomy. The larger course design as a whole supported this feeling. The interviewees reported ease with aligning the course project to their learning needs and preferences and found the course content and pathways supported their learning and helped them complete the course project. When Emma was asked whether she felt autonomous in the personalized course, she said:

> I think the course was definitely set up to [support autonomy], you could be as engaged or disengaged as you wanted. The pathways were nice because I could follow my path. I also was able to read about workplace, designing for the workplace, which I did. I felt that was really helpful and interesting.

When Maya was asked about the support for autonomy in the personalized course, she said:

> I think it did create autonomy for me to be able to go and teach myself how to use something new… I think it most definitely did because of learning, going out and deciding what web 2.0 tool that I wanted to investigate for my lesson plan…The pathway

specifically helped me determine and align course content with initiatives that I needed to accomplish at my job too.

Competence

Interviewees from both courses were asked whether the course supported their feeling of competence. The researcher also investigated the specific factors that contributed to support this feeling with respect to completing the course assignments. Amelia—a participant from the personalized course—stated that the completing the course increased her feeling of competence by challenging her to work on certain tasks. She explained:

> I think that my confidence increased significantly because of this course. I feel like it also challenged my competence. Where I was a little bit more confident that I would be able to do certain tasks, it kind of humbled me a little bit to realize that I wasn't as good at it than I had thought I was. Overall, my confidence increased because of this course and, in a sense, it brought to light what I needed to work on.

David—another participant from the personalized course—said the course provided enough assignment instructions that supported his feeling of competence. When asked him about his feeling of competence in this course, he responded, "yeah, the instructions for all assignments were clear for the most part. And they were thorough. So as long as you would read the assignments carefully, you could understand what you were expected to do."

Participants from the one-size-fits-all course mentioned they felt competent when completing the *course project.* In comparison, interviewees from the personalized course indicated that the *personalized course design* was the factor that supported their feeling of competence.

Course project

Participants from the one-size-fits-all course indicated that because the course project was designed so that they had flexibility to create their project based on their interests, it supported their feeling of competence. Participants mentioned that the course project assisted

them with progressing consistently throughout the course and increased their confidence in completing their projects. For example, when asked about her feeling of competence, Emily explained that the course project "was for a real-world situation, so that made me feel competent in instructional design." Those participants found that the course project assignment was authentic, relevant, and flexible in both courses (the one-size-fits-all and personalized courses). Kim said, "I think that the three part project, because we were able to choose what we wanted to do, that free choice allowed me to pick something that was relevant to me."

Personalized course design

Interviewees from the personalized course explicitly stated that the personalized course design (including the learning pathways) supported their feeling of competence. They indicated that they felt competent when they found the learning pathways were providing content that aligned with their learning needs and interests. They mentioned that such course design increased their competence significantly. Emma said:

> I really liked the idea of the pathways. I felt that was really helpful and most of the articles were [focused on her topic of] higher education … I felt like reading those articles and being able to discuss those with my colleagues, that's kind of like a success for me because I feel like, "Oh, I'm on the right path" … I feel that I was able to demonstrate to myself that I have learned something, so I feel more confident in a sense, and even a little bit more confident in my abilities to even talk about things or suggest things.

When Maya was asked about the support for competence in the personalized course, she said, "I do, because I think it added to my ability to think about what I can use to engage the students in my classes." She also mentioned that the course design supported her feeling of competence because it provided her with the opportunity to meet other students from the same learning pathway to provide personalized feedback. She said: "I do [feel competent] particularly

because people in my same pathway were able to provide feedback. Their feedback could be more specific because it's coming from someone that knows essentially what realm you're in."

Relatedness

Interviewees from both courses were asked to reveal the factors that supported their feeling of relatedness. The findings showed that level of relatedness varied among them. While some interviewees reported they felt related during the course, others did not feel connected or that they belonged to the environment. Most of the interviewees did not feel related and lacked connection with others within their courses. Interviewees who felt related and connected socially reported that *interaction with their instructors* played an important role with respect to this type of feeling. These findings did not reveal whether personalizing the course (*e.g.*, personalizing discussion boards and peer feedback) supported the students' feeling of relatedness. The findings also did not reveal different themes between the students from the two courses. However, the theme of *lack of interaction between students* emerged from interviews and course reflections from both courses.

Interaction with their instructors

Interviewees from the one-size-fits-all course revealed that they felt related to the instructors. Interaction and communication with the instructors played an important role with respect to this feeling. Emily said, "to my other classmates I would say no … if it was for the instructor I did feel very connected to, very relatable. She was quick to respond". When Sara was asked how the instructor helped her to feel related to the social environment, she said, "I definitely felt like I belonged … [the instructor] was really helpful in kind of walking me through those, answering my questions, and making me feel supported." Interviewees from the

personalized course indicated similar findings because they felt connected with their instructors.

Maya said:

> yeah. She was great. She was very open and very quick to reply whenever you had a question, and especially since the way she delivered her beginning weekly message via either voiceover PowerPoint or voiceover with a video and stuff. So you really got to feel connected with her too.

Interaction between students

Interviewees from both courses indicated a lack of interaction with other students. Most of the interviewees did not enjoy the interaction and communication strategies that were implemented in these two courses.

One-size-fits-all course. Interviewees from the one-size-fits-all course indicated that the course did not support their feeling of relatedness, and they lacked interaction. When Katherine was asked about her feeling of relatedness in the course, she said she did not feel related to her peers, stating, "no, not really, the discussion board is the only way we have of connecting, and it's hard to find comments that you made to somebody". Emily confirmed, saying "yeah… the instructor I did feel very connected to, very relatable … to the other students I would say no."

Personalized course

Interviewees from the personalized course felt the pathways were helpful to their learning, but unfortunately, they noted that the design of the course pathways lead to a decrease of interaction with other students from other pathways. Students felt that a lack of interaction with their peers led to a lack of relatedness/connectedness to others in the course. Emma explained, "I would say in the sense that maybe intellectually I felt connected [related] to them, but on a social level, not really." Amelia said, "I didn't really know anyone so I didn't feel connected [related] in that sense." Personalizing the discussion board according to the learning

pathways did not contribute to increasing students' interaction and connection with each other.

Both Emma and Amelia indicated that they enjoyed the personalized pathway design, but they

were the only learners in each pathway. Amelia said:

> It was a motivating factor and a challenge in that you were able to tailor the
> course to your specific interests. It was a motivating factor because I was able to
> immediately apply the concepts learned under a higher educational setting which I
> then took to my current position. But it was a challenge because no one else chose
> that track."

Intrinsic motivation

Intrinsic motivation was investigated qualitatively in this study. The researcher

specifically asked interviewees from both courses whether were intrinsically motivated and the

contributing factors that supported and enhanced that motivation. Interviewees from the one-

size-fits-all course found *instructors' facilitation* to be a motivating factor and an influencing

factor that motivated them. Interviewees from the personalized course considered *personalized*

readings to be motivating factors because they could conceptualize the application of those

readings to their current job practices. *Curriculum relevance* tended to be a factor in both

courses. Interviewees from the one-size-fits-all course described the content as *relevant* but with

instructor support and facilitation, while interviewees from the personalized course found the

curriculum *personalized* and *relevant* to their learning without assistance from instructors.

Instructors' facilitation

Interviewees in the one-size-fits-all course indicated that they felt motivated when they

received *effective facilitation from their instructors*. They thought their instructors were flexible

enough to modify the course to meet their needs and interests. They mentioned that the

instructors provided support that helped them remain motivated throughout the course. Some

interviewees mentioned that without the instructor facilitation, they almost dropped the course.

Katherine said her instructor "was the most down to earth person I worked with yet … he kept me motivated to keep going because I kept telling him, I'm not a K-12 teacher". Sara said, "my professor was super forthcoming about that, very helpful in finding how to adapt the project, like the standards of the assignment and the rubric, finding ways to adapt that to what my actual job needed." Thus, instructor facilitation and interaction played a major role in motivating learners in the one-size-fits-all online course.

Personalized readings as a motivating factor

Personalized reading content in the personalized course was found to be a motivating factor for students. Surprisingly, interviewees from this course mentioned they wanted more personalized readings that targeted the pathways. This factor did not emerge in the one-size-fits-all course, where all readings were focused on K–12 teaching and learning. Amelia said, "I'm also motivated because I could directly apply what I was reading in these articles to my daily practice." Emma works as an instructional designer and instructor, and she was designing and developing lesson plans for classrooms in higher education settings. She indicated that the personalized readings assisted her with applying knowledge to day-to-day practices. She said, "[the course] showed me my gaps, it was motivating in and of itself … a lot of times, the articles that we read, I tell my boss about them like, you should read this, because it's first of all, developing our curriculum and stuff." David found the personalized readings (in the corporate training pathway) to be a motivating factor. He said, "It was interesting, it was relevant".

Curriculum relevance

Curriculum relevance means that students receive learning content and materials that are aligned with their needs and interests. The tasks must meet their short- or long-term goals. In this

study, *curriculum relevance* was found to be a motivating factor for most interviewees from both course types.

One-size-fits-all course

Even though the one-size-fits-all course did not include a relevant curriculum for students with interests in other areas than K–12 teaching and learning, instructors did successfully help students to engage during their learning in the course and feel motivated. Findings showed that instructors assisted and facilitated their learning, and they did successfully bring the readings, assignments, and focus of the course toward their learning needs and interests. Students indicated that instructors motivated them to learn by engaging with them in the discussion boards and helping align the materials, content, and assignments toward their learning preferences. Katherine—who enrolled in the one-size-fits-all course—did not enjoy the course focus and mentioned that the instructor helped her align the course focus toward her needs, which motivated her to work on the course assignments. Sara said, "my professor was helpful in finding how to adapt the project, finding ways to adapt that to what my actual job needed". Only Kim mentioned that the one-size-fits-all course provided her with relevant learning materials that met her needs and interests, which were to teach in K–12 settings.

Personalized course

Participants from the personalized course indicated that the curriculum was successfully personalized to their learning and provided relevant learning content that can be applied in their workplace. Amelia said, "we like things to be relevant. We like to be able to apply it, and it was motivating factor. I'm also motivated because I could directly apply what I was reading in these articles to my daily practice." Emma said:

> I'm satisfied with what I learned in the course. I think it was designed well in the sense that it was manageable. I felt like I was able to learn that things that I wanted to learn… I work with college students, I want to know how to improve their learning.

When Maya was asked about her intrinsic motivation in the personalized course, she responded that course provided relevant materials that assisted her learning and professional experience. She said, "I really, really enjoyed the section where we were split into different pathways. I thought that was a great idea because that way we got to experience material that was specifically for, in my case, the corporate pathway and share with the other people that are in the corporate pathway."

By comparing the *curriculum relevance theme* from both course types, the findings showed that even without intervention and help from the instructors, students in the personalized course found the curriculum to be *personalized* and *relevant* to their learning needs. The interviewees indicated that they felt motivated and engaged when they found the learning materials to be aligned with their learning needs and interests.

2. **What is the effect of personalized learning as an instructional approach on graduate students' online learning engagement?**

The researcher intended to investigate the effect of personalized learning as an instructional approach on graduate students' online learning engagement. The researcher applied OSE (Dixson, 2010; 2015) to measure students' online learning engagement quantitatively, including four engagement constructs (skills engagement, emotional engagement, participation engagement, and performance engagement). GLM was conducted to reveal the effect of this approach on students' engagement. The researcher also followed the survey data collection with ten interviews to collect qualitative data that explained and revealed how students were engaged

during their course experiences. Thematic analysis was applied to investigate the themes and factors that emerged from the interview data.

Engagement Quantitative Results

The online learning engagement null hypothesis stated, personalized learning as instructional approach will not statistically significant increase students' skills, emotion, participation, and performance engagement. An ANCOVA was performed to determine the effect of personalized learning as an instructional approach on students' engagement after controlling for the pretest. The pretest of each score was used as the covariate variable in the model to adjust the mean. One-way ANCOVA assumptions were tested for each hypothesis. There was a linear relationship between pre- and post-intervention for all four variables, as assessed by visual inspection of a scatterplots. There was homogeneity of regression slopes as the interaction terms were not statistically significant, skills = $F (1, 60) = .586$, $p = .447$, emotion = $F (1, 60) = .005$, $p = .94$, participation = $F (1, 60) = .573$, $p = .452$, performance = $F (1, 60) = .567$, $p = .454$. Standardized residuals for the interventions were normally distributed for skills, emotions, and participation, as assessed by Shapiro-Wilk's test ($p > .05$). However, performance as dependent variable was not normally distributed as assessed by Shapiro-Wilk's test ($p > .05$). There was homoscedasticity, as assessed by visual inspection of the standardized residuals plotted against the predicted values. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. However, there was two outlier cases with standardized residuals slightly greater than ± 3 standard deviations, and they were not removed as they did not have significant impact change on the results. After adjusting for the pretest skills, emotion, participation, and performance engagement, there were no statistically significant differences in the posttests between the groups, skills = $F (1, 61) = 3.61$, $p = .062$,

emotion = F (1, 61) = 1.24, p = .26, participation = F (1, 61) = .185, p = .66, performance = F (1, 61) = 1.51, p = .22. The *p value* (> 0.05) indicated the null hypothesis could not be rejected, which means that personalized learning as an instructional approach has no statistically significant increase on students' online learning engagement. However, the results showed that students in the personalized course had almost identical mean scores for the four engagement variables to students in the one-size-fits-all course. The posttests and pretests were almost the same for both courses. This means that the personalized learning approach neither increased nor decreased students' engagement, which indicates that the personalized approach had a similar effect to the one-size-fits-all course. These results indicate that students in both courses were already engaged in online courses before joining the experimental courses, and they then found both courses (the personalized and one-size-fits-all courses) engaging as well. Table 4.5 shows the adjusted and unadjusted means for the online learning engagement.

Table 4. 6 *Adjusted and Unadjusted Means and Variability for Online Learning Engagement*

Engagement	Groups	Unadjusted			Adjusted	
		N	M	SD	M	SE
Skills Eng.	PL course	40	3.8	.76	3.8	.08
	One-size-fits all course	24	4.1	.57	4.1	.10
Emotion Eng.	PL course	40	4.56	.43	4.54	.06
	One-size-fits all course	24	4.38	.46	4.42	.08
Participation Eng.	PL course	40	3.77	.86	3.7	.09
	One-size-fits all course	24	3.67	.79	3.7	.12
Performance Eng.	PL course	40	4.4	.73	4.5	.08
	One-size-fits all course	24	4.64	.47	4.6	.11
*Covariates appearing in the model are evaluated at the following values: Skills pretest = 4.05.						
*Covariates appearing in the model are evaluated at the following values: Emotion pretest = 4.46.						
*Covariates appearing in the model are evaluated at the following values: Participation pretest = 3.79.						
*Covariates appearing in the model are evaluated at the following values: Performance pretest = 4.63.						

Engagement Qualitative Results

The second major theme in this study is online learning engagement to investigate how students perceived their online learning engagement in the one-size-fit-all course compared with the personalized course. (See Table 4.10). Within the major themes, subthemes were defined to analyze the factors that supported students' engagement and positive learning experiences. Then subthemes (*e.g.*, engagement and disengagement) and factors (*e.g.*, course project, personalized readings, and instructor facilitation) were then compared between the two courses to reveal the effect of personalized learning as an instructional approach in online learning courses (See Table 4.10). The purpose of this comparison was to determine the factors that affected students' feelings of self-determination, intrinsic motivation, and online learning engagement and whether

personalized learning as instructional approach contributed to support those variables within online learning courses.

Interviewees from both courses were asked to report the factors that contributed to their engagement in these two types of online learning courses. In particular, interviewees were asked whether the *course design, instructors, learning content, teaching and learning strategies,* and *course activities and assignments* contributed to their online learning engagement or disengagement.

One-size-fits-all course. Findings from one-size-fit-all course showed that *instructor facilitation, course project,* and *feedback* appeared to be engagement factors that contributed to students' learning.

Personalized course. Findings from the personalized course revealed that *personalized readings, instructor facilitation, course project,* and *feedback* appeared to be contributing factors to engaging students. Interviewees from this course showed evidences that the readings engaged and motivated them to accomplish their learning needs. However, findings showed that the *online discussion board* was a disengaging factor in both course types.

Instructors

Instructor facilitation in these two online courses appeared to contribute to engaging learners. This theme appeared in almost all interviews from both courses. Interviewees found that the instructors' flexibility, clarity, and effective communication style engaged them more than anything else in the course did. Sara said, "they've been super helpful whenever I have reached out and they've also been really flexible. I think their organization, clarity, and flexibility has been the most impactful levels of support for me". Emily mentioned that "instructors were always a prompt with their feedback." Kim mentioned that instructors' interaction in the online

discussion could direct, engage, and assist students with learning, which should be equivalent to leading discussions in face-to-face courses. Emma—an interviewee from the personalized course—mentioned that instructors' interaction helped her to engage in the course. She said, "it seems that has a lot to do with the way that the instructors interact and their personalities". Maya, an interviewee from the personalized course, said:

> my instructor was excellent. She did a very nice job of communicating information at the beginning of the week or before for us to look at the beginning of the week. I enjoyed the fact that she did either video or audio messages for us to be able to listen to her expectations of the week, so that was really good.

Course project

The course project contributed to students' online learning engagement from both course types. All interviewees had positive experiences with the course project. Interviewees indicated that the course project was the most effective and positive learning experience for them. Three reasons emerged from the interviews that support the course project as an engaging factor in both course types: (1) *the topic of the course project was engaging for the learners,* (2) *the course project allowed progress based on the learners' time,* (3) *the course project allowed learners to control their learning progress,* and (4) *breaking the course project into smaller assignments with instructors' fee*dback throughout the course time was beneficial. Emma said, "I like it better when the projects are broken down in smaller pieces and the instructors take the time to give you feedback on each step." Amelia said, "I did find it super helpful that the final project was in parts." As a result, the course project remains the major engagement factor that enhanced students' learning in both course types. When Maya was asked about the engagement factors, she mentioned that the course project was one. She said, "the class project was good. Looking through and learning how to include the web 2.0 tools within a lesson that really engaged the

learner." David found that the course project was an engaging factor because it provided a topic that is interesting to him and his profession. He said:

> I probably would go back to the concept of focusing on the learner when you're putting together design. That to me was engaging and interesting because it's something that I've only become aware of recently, and I find interesting… [and] the course project was an exercise in doing that.

Feedback

Feedback was found to be a supporting factor for learners' engagement in online learning courses. Participants from both courses indicated that providing consistent feedback throughout the course helped them engage in learning. They felt that learning occurs when instructors provide consistent feedback on their assignments. Further, the findings showed that students were supported by peer feedback, which enhanced their learning.

In the personalized course, students were directed to provide personalized peer feedback to each other based on their learning pathways, which was effective in the sense that they provided feedback from the same perspectives (*e.g.*, higher education perspectives). When Amelia was asked about the personalized feedback that she received in the course, she responded as "actually, the weekly discussions where we posted part of our content and got feedback on that, that was huge because now I've put the time and effort into this project. I've thought about it, I've pulled in from the readings. I've really applied it and now I'm getting your feedback. That was probably the other strategy that was most helpful." Emma said, "get more feedback on my project because that's actually when somebody gives me feedback on something that I'm actually working on, then I feel like I'm learning more." Maya responded that instructor's feedback engaged her in the course. She said, "[the instructor] was very engaged in feedback with us as far as responsiveness and appropriate feedback." David indicated that he received good peer

feedback, he said "I got a lot of good feedback. They were professional and friendly, but also honest."

Personalized readings as an engaging factor

As the personalized course provided personalized readings to students, the researcher investigated whether those readings engaged learners cognitively and enhanced their online learning engagement. While the one-size-fits-all course provided readings that supported the learning of students interested in K–12, the personalized course provided readings that address different learners' interests and needs. The personalized readings targeted potential student interests in K–12, higher education, corporate training, and instructional designing consultancy. Therefore, interviewees from the personalized course indicated that the readings engaged them and assisted them so that they avoided hunting for additional readings that addressed their interests and learning needs. The personalized readings successfully engaged learners, especially when they found alignment among their pathway selection, course project, and the readings given in the course. Emma said:

> I like the readings especially to support me… because I see it so closely aligned with what I want in my career, I really liked the project because I can take something that we were reading about and it'd be turn around and think about what it would look like in my classroom.

Amelia indicated that the personalized readings (articles and case studies) were helpful and personalized to her learning needs, which engaged her effectively. She said:

> When I had to actually do the project, then I pulled more into the reading and how I could apply them and what I needed to do…I think maybe the case studies really helped too because that was application… We discussed some general concepts and ideas, but I think when we had a case study, we were able to look at a specific situation and then apply, it wasn't a huge project, it was just looking at one. I think that course component made it more personalized for me.

Maya indicated that the readings in the personalized course supported her learning preferences and engaged her. She said, "the readings were appropriate and gave the right amount of material." In comparison, reading as an engaging element did not emerge in the one-size-fits-all course, and findings showed that students were not reading at the required level and were complaining about the quantity and quality of the readings.

Disengagement

Interviewees from both courses identified the discussion board as a disengagement factor. Most of the interviewees revealed their negative experiences with the weekly discussion assignments. It was assumed that the interactions and communications among students would occur through the discussion board, which would enhance their feeling of relatedness and increase interaction. However, it was found that online discussion board was a disengaging factor that negatively affected most students' feeling of relatedness in both courses. Emma, an interviewee from the personalized course, said, "the discussion boards, they don't do anything." Emily and Katherine were interviewees from the one-size-fits-all course. Emily said, "honestly most of the discussion boards, but that's not unique to this course, a lot of the discussion boards just felt like busy work throughout the whole program". Katherine said, "I really don't like discussion board." Sara said, "I don't find [the discussion board] as helpful as I do in-person discussions." These findings revealed that students found the online discussion board disengaging and considered it a negative experience.

3. **How did graduate students' experiences differ between an online course with a one-size-fits-all approach and an online course with a personalized learning approach?**

The researcher intended to investigate how students experienced and perceived the personalized learning approach in an online course compared with students' perceptions and

experiences of a one-size-fits-all approach. Questionnaire items to capture learning experiences and experiences with the course instructors were developed to collect data from both courses. In addition, the participants in the personalized course responded to 11 questionnaire items (on a five-Likert scale) developed to capture their experiences of the personalized learning approach in the online course. These items were only administered to students who received personalized learning experiences (Appendix C). Independent sample t-tests and descriptive statistics were applied to investigate the experiences and perceptions quantitatively. Then the researcher followed the quantitative data collection with ten interviews—four from the one-size-fits-all course and six participants from the personalized e-learning course—to help explain the themes and factors that supported students learning in the two online courses. During the interview, the researcher asked students in the personalized course additional questions that were developed to investigate their experiences with personalized learning approach. These questions were added to the interview protocol to further explain their responses to the survey items and help understand their experiences with the personalized learning approach qualitatively (Appendix B).

Perceived Learning Quantitative Results

Online course experience

The null hypothesis stated: there will be no statistically significant difference between students' learning experiences in the personalized online learning course compared with students' learning experiences in the one-size-fits-all course. An independent t-test was performed to compare students' experiences in the personalized learning course with their experiences in the one-size-fits-all course. This comparison between the groups sought to explain students' ratings of their experiences during the course times. There was a statistically significant difference in students' learning experience scores between the experimental and control groups

(the personalized learning and one-size-fits-all courses), with a higher mean for students in the personalized course, $M = 0.600$, 95% CI [0.077, 1.123], $t (62) = 2.294$, p = .025, $d = .57$. There was a homogeneity of variances for students' learning experiences for the two groups, as assessed by Levene's test for equality of variances ($p = .171$). Students rated their learning in the personalized course to be higher and more satisfying than students in the one-size-fits-all course did. Table 4.6 shows the independent sample t-test of online course experience between groups.

Table 4. 7 *Independent Sample T-test of Online Course Experience Between Groups*

Dependent Variable	Groups	Independent Samples t-test						
		N	M	SD	t	DF	Sig. (2-tailed)	Cohen's d
Online Course Experiences	PL Course	40	4.10	.928	2.294	62	0.025	0.576
	One-Size-Fits-All course	24	3.50	1.142				

Perceptions toward instructors

The null hypothesis stated: there will be no statistically significant difference between students' experiences with their instructors in the personalized online learning course compared with students' experiences in the one-size-fits-all course. Both instructors taught the one-size-fits-all and personalized courses. At the end of each course, students were asked to rate their experiences with their instructors. A Welch t-test was run to determine whether there were differences in students' instructor ratings due to the assumption of homogeneity of variances being violated, as assessed by Levene's test for equality of variances ($p = .003$). There were no outliers in the data, as assessed by the inspection of a boxplot, and the rating scores for the two groups were normally distributed, as assessed by Shapiro–Wilk's test ($p > .05$). The instructor

rating scores in the personalized course were higher ($M = 4.50$, $SD = 0.68$) than in the one-size-fits-all course ($M = 3.75$, $SD = 1.113$), which presented a statistically significant difference, $M = 0.75$, 95% CI [0.239, 1.261], t (33.444) = 2.984, $p = .005$, $d = 0.81$. The results indicated a significant increase in students' rating of their experiences with their instructors in the personalized course, which indicates the personalized learning approach was a solution that enhanced instructors' teaching ability to accommodate all students' learning needs, interests, and preferences. Table 4.7 shows the independent sample t-test of students' instructor ratings between groups.

Table 4. 8 *Welch T-test of Students' Instructor Ratings Between Groups*

Dependent Variable	Groups	Welch t-test						
		N	M	SD	t	DF	Sig. (2-tailed)	Cohen's d
Online Course Experiences	PL Course	40	4.50	0.68	2.984	33.444	0.005	0.813
	One-Size-Fits-All course	24	3.50	1.113				

Personalized course

Descriptive statistics were examined to assess students' experiences in the personalized course. The participants in this course agreed that the course was personalized to their learning needs ($M = 4.35$, $SD = .80$), and they enjoyed learning through the personalized pathways ($M = 4.68$, $SD = 0.62$). The participants also reported that the personalized approach supported their learning choices ($M = 4.45$, $SD = .75$), learning preferences ($M = 4.45$, $SD = .60$), and learning interests in the subject ($M = 4.40$, $SD = .78$). Most found the course contents to be aligned with their learning goals ($M = 4.30$, $SD = .88$). Almost all participants reported that they received

personalized feedback to their learning ($M = 4.55, SD = .64$). The participants also found

personalized learning as an instructional approach to be supportive and effective at leading

toward deeper learning ($M = 4.55, SD = .60$). One of the study's goals was to provide the

opportunity for learners to be independent and control their learning, and the results showed that

most indicated they were independent learners in the personalized course ($M = 4.55, SD = .60$).

Additionally, the participants found the online learning discussion assisted them with reflecting

on their learning ($M = 4.30, SD = .79$). Finally, the participants indicated they had met their

specific personal goals for joining the course ($M = 4.25, SD = .98$). Table 4.8 shows the

descriptive statistics of students' experiences of the personalized learning course.

Table 4. 9 *Descriptive Statistics of Students' Experiences of the Personalized Learning Course*

Personalized Learning Items	Personalized Learning Participants (n = 40)			
	Min.	Max.	M	SD
This course was personalized to my learning needs.	2	5	4.35	.802
I liked the "three learning pathways" design.	2	5	4.68	.616
The course content supported my learning choices.	2	5	4.45	.749
The course used instructional strategies to facilitate my learning preferences.	3	5	4.45	.597
The course content supported my learning interests in the subject.	2	5	4.40	.778
The course contents were aligned with my personal learning goals.	2	5	4.30	.883
I received personalized rapid cycle feedback.	2	5	4.55	.639
The course helped me to progress toward deeper learning.	3	5	4.55	.597
I was an independent learner in this course.	3	5	4.55	.597
The weekly discussions helped me to reflect on my learning.	2	5	4.30	.791
I met my personal learning goals during this course.	2	5	4.25	.981
Note. Reponses ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).				

Perceived Learning Qualitative Results

The third major qualitative theme in this study is *perceived learning*. The purpose of this theme was to investigate how students perceived the personalized learning approach compared with the one-size-fits-all approach in an online course (See Table 4.10). The researcher examined interviewees' perceptions of their learning from both course types. Several themes emerged that represent how students perceived their learning in these two courses. The researcher intended to compare themes that emerged from both courses to reveal whether the personalized learning approach affected students' learning and provided positive learning experiences.

One-size-fits-all course. Interviewees from this course indicated the *need to personalize* this course to address their learning needs and meet their educational backgrounds. When the researcher asked interviewees how they perceived their learning during the course time, Emily, Katherine, and Sara mentioned that the one-size-fits-all course did not meet their expectations or learning needs. The *students unsatisfied with the course content and course approach* theme emerged from these three interviews. This theme showed that most students who took this course did not have interests or needs in K–12 settings, which led to negative learning experiences. Finally, this theme indicates that the course should be designed with multiple pathways that address individual learning needs and career interests.

Personalized course. From the personalized course interviews, *personalized learning approach, learning choice, learning interest, learning control, personal goals, and deeper learning* appeared to be the pieces of evidence showing positive student experiences. These themes revealed that personalized learning provided a positive learning opportunity and enhanced students' learning needs and choices, supported learning interests, and allowed for

more learning independence. Interviewees from this course found the course design (personalized learning) supported their online learning and was more effective.

Students unsatisfied with the course content and course approach

This theme emerged from interview analysis from the one-size-fits-all course. Participants were asked to describe their learning in this online course. The results showed the need to personalize this particular online course to meet students' learning needs and interests. They also showed pieces of evidence for the need to incorporate more learning choices to address students' learning needs that align and support their career endeavors. Katherine indicated that she joined the course based on the description that was listed on the program website. Even though Katherine works at the corporate training sector as a technology trainer, she had to complete the K–12 learning focus. She said:

> I didn't know when I signed up for it that it was based on K-12. I have no desire to be a K-12 teacher … But I just kind of like, okay, well, I'm here, gotta do something with it. What was interesting, not having a K-12 background, I was literally making stuff up as to what I would put in my lesson plan.

Sara mentioned that she wanted to make the course's project apply to her current job and her profession. She said, "for me, it was finding how to make the project apply to my current role, my professional role." She indicated that the instructor managed her choices and allowed for more flexibility in the course. Sara mentioned that the instructor was providing her with relevant reading materials even though the course focused only on the K–12 context.

Emily had an interest in higher education, and she wanted to gain a master's degree to enhance her knowledge in higher education teaching and learning. She said, "I'm interested in higher education because I work at a community college, so anytime we could take the content and engage in it in a way that was personal, that was relatable to me." However, she had issues

with the "one-size-fits-all" course assignments. She indicated the struggle to direct the focus toward her interests and needs as well as with the clarity of the assignments. She also complained about the focus of the materials in the course on K–12 teaching and learning.

Unsurprisingly, the "one-size-fits-all" course was helpful primarily to students who were focusing on K–12 settings. Kim was interested in instructional design for both higher education and K–12 settings and mentioned that she successfully managed to use the course materials and content to work on the course projects and assignments.

Personalized learning approach

The personalized course provided personalized pathways/tracks that allowed students to align the course content toward their learning needs and interests. Interviewees were asked to share their experiences regarding the pathway design and whether this design addressed their learning needs and expectations from the course. The results showed that a *personalized to learner strategy* using a pathway design was effective for students' alignment of the learning with their needs and interests. To compare this theme with the *students unsatisfied with the course content and course approach* theme, it was revealed that students needed personalized learning as an instructional approach to provide a flexible course aligned with their learning needs. The results also showed that students liked the *personalized pathways* design and enjoyed learning from this method, but it was challenging for some learners who were the only learner in that pathway. A participant such as Emma felt motivated and engaged when she found the pathway that met her learning needs and interests. She said:

> I think the most meaningful thing for me was the concepts of the pathways … I didn't want to spend time for using K through 12 things that I'm just never going to use … you don't have to keep go hunting for a lot of additional readings or information.

Therefore, Emma indicated that the course successfully provided the needed learning pathway that helped her to focus on what she needed from the course. Amelia indicated that readings (*textbook, articles, personalized case studies,* etc.) and assignments (*course project*) were personalized components for her learning. Maya found that the course was personalized and aligned with her learning needs and interests too. She said, "I think that was a really strong point of this class is the pathways because it did allow us to focus on real world problems that we know and that we experience. I think that was good." David found the personalized course effective and with the potential to be developed and implemented in his context. He said:

> I would design something similar, yes. I think the pathways were good. I know, for example, for the pathway that I was in, it was really appropriate and helpful to have that pathway. I think possibly if I were a decision maker in creating a program like this, I might consider more or different pathways and I don't even know if I can say what they would be, but I would possibly consider maybe having a couple of more pathways that would more personalize the learning… I definitely learned a lot. Not only from my corporate perspective that I've been in for so long. But as I mentioned, also interacting with students who were in other pathways. We were in the same course, but we were in different pathways and I can say I learned a lot from my interactions with students in other pathways too.

Table 4. 10 *Interviewees' Perceptions of Personalized Learning*

Interviewees (Pseudonym)	PL Definition
Sara (One-Size-Fits-All Course)	"I definitely think this approach can be helpful. I personally think it's a necessity for students to feel like that learning applies to them and the world around them".
Katherine (One-Size-Fits-All Course)	"Personalized training would be great. Instead of having to follow a specific curriculum"
Emily (One-Size-Fits-All Course)	"I'm a big advocate for customized or personalized learning. It's hard to do that. I'm just thinking about my situation. I am particularly interested in online science education. I have a very strong background in science, so it would be kind of hard for an instructor who wasn't as comfortable in science to advise and to work with me. It is very nice in theory, but hard to implement".
Kim (One-Size-Fits-All Course)	"I think that it would be very effective, personalized learning is really [a] key to the transfer of knowledge".
Amelia (Personalized Course)	"Personalized learning in a formal environment is awesome because you still have the structure of the formal environment and hopefully the guidance, but you're able to take what you need to from the course and learn how to apply it to your own work environment...I think it's a huge motivating factor for people".
Emma (Personalized Course)	"I think that it's really important and I think that there's definitely a movement in education to look more at [personalized learning] rather than treating students all the same".

Table 4.10 continued

Maya (Personalized Course)	"I think it's really great because not everybody has the same goal or same need to learn things. They may need to learn for a different reason than others. I think personalizing the learning is really good because that way it's more relevant to what the student needs. And in this case, I was a corporate learner, so it was more about doing the corporate pathway. It was more relevant to my world, more realistic for me so that would go for everyone else. My conversation is about corporate, and what we do in my company wouldn't necessarily apply to what someone needs in kindergarten".
Jessica	"I think it is great when whenever people can choose how they get through their assignments, but I question how personalizing can be because if you are developing training or lessons for thousands of people".
David (Personalized Course)	"I think personalized learning is great. It's a newer concept if I'm not incorrect about that. It's a newer concept in instruction. And I think it's good. It presents a lot of challenges, but I think if it can be done properly, it's good".
Lisa	"I think it is a great idea, it is just sometime challenging to accomplish".

Learning choice

Interviewees from the personalized course were asked to describe how the personalized learning approaches met their learning choices. Findings revealed that the course successfully provided more learning choices that directed students' learning toward their interests. Students personalized their learning by selecting the focus of the course and progressed toward meeting their personal learning goals. Amelia said, "I've done continuing education in my work life, like I said, for seven or eight years, higher education was spot on for what I needed… it still was absolutely spot on". Emma said, "I think it was helpful to me because I could differentiate between what I needed to learn and what I could learn as an option." Maya agreed that the course

provided learning choices that met her learning needs "because they were focused ... corporate was a pathway, and since that's where my job is located."

Learning interest

Supporting students' interests was one of the ultimate goals of implementing personalized learning as instructional approach. Therefore, this theme was examined from both the one-size-fits-all and personalized courses. Interview results showed that personalized learning increased and enhanced students' learning interests when provided with learning pathways that included content to address individual learning needs. Amelia said, "my interest level was increased because I'm already in that area of higher education being in continuing education. My interest level was piqued." Emma indicated that personalized course helped her to follow the pathway that interests her. She said, "I think I just followed the same pathway that I'm interested in." David indicated that the course allowed him to follow the focus he wanted (corporate training). He said:

> Well, it allowed me to focus on what I'm familiar with and comfortable with. At least as a starting point, so it focused on what I do in my everyday career now, but also it allowed me, by interacting with students who are on different pathways, it allowed me to explore other ways of looking at the same question.

In comparison, interviews from the one-size-fits-all course did not show any pieces of evidence that the course enhanced their interest in the course topic.

Personal goals

The personalized course was designed to provide the opportunity to all students to meet their own learning goals. Students in the personalized course were asked to set their personal goals and identify what they aimed to learn from the course topic during the first week of the course, and they were asked to reflect upon those goals and whether they met them at the end of the

course. All interviewees revealed that they met their personal goals and that the course assisted

them with meeting those goals. Maya said, "I think that I met and exceeded my goals for the

class because I see a new and larger picture now of what the 21st Century Classroom will look

like (thinking outside the box)." David stated:

> My main goal, overall, is to become a true instructional professional. That means everything from the analysis phase to the delivery phase and beyond. This course focused on all phases of instruction and taught me a great deal about each one. The flow of the course, along with the comprehensive project due at the end, definitely helped with my learning of the material and the important lessons. I have already begun using some of what we learned in this course and it's made me more professional and knowledgeable.

Learning control

One of the personalization goals is to enhance students' learning control and

independence (Bray & McClaskey, 2016; Watson & Watson, 2017). Interviewees from the

personalized course mentioned that this course allowed for both. Emma said:

> I definitely feel like I was able to sort of take control of my learnings, to determine how much I wanted to invest or learn more or dig deeper. I think I had a lot of control for the most part. Obviously, I could design the project I wanted, do readings that I wanted.

When Maya was asked about controlling here learning in the personalized course, she said, "it

did, because it was very focused on what the needs were within my particular pathway." David

also agreed that the course provided the opportunity to take control of learning. In comparison,

interviewees from the one-size-fits-all course indicated they were independent learners, but there

was no evidence that the course design supported their learning control and independence.

Deeper learning

The personalized course provided learning pathways to increase students' learning

engagement to result in deeper learning. Interviewees from the personalized course were asked

whether the course assisted them with learning deeply about the topics in which they were

interested. The results showed that the personalized learning approach successfully helped students learn deeply by directing them to focus on what they needed to learn and providing personalized content. The course provided learning content that discussed authentic learning in corporate training, K–12, and higher education. This alignment between the course content and students' learning backgrounds and interests assisted students with learning deeply. Emma said:

> I've really been interested more in authentic learning and then, I think this class, the idea of the partnering and stuff really started to talk about more of what that looks like. I felt like I was learning about this more deeply about this topic.

Amelia also indicated that she learned deeply in the personalized course, and it occurred through the course project. Maya indicated that the personalized course helped her learn deeply, saying, "With deeper learning, yeah, I think with that one it's learning about bringing new ways to do something with the learner being the focus, and… learning more about the learner-centered approaches and what way we can engage the learner". David found the course focus and structure provided him the opportunity to learn deeply to understand the content. He explained:

> I think it, the course really dove into the subject matter in a pretty thorough way and it seemed like we were going over certain things week after week, but it was progressing as the course went on to really take a deeper dive into the subtopic. And that was helpful. It really, it wasn't just, like one week, we talked about one thing. And then another week, we talked about another thing. But it seemed to progress down a line of progression that made sense and that helped solidify the understanding of the subject.

Table 4. 11 *Comparison Between Qualitative Themes and Factors from Both Courses*

Major Themes	Subthemes	Factors-sub-factors from one-size-fits-all- course (Interviews N = 4)	Factors-sub-factors from personalized e-learning course (Interviews N = 4)
SDT (Research Question #1)	Feeling of Autonomy	Course Project - *Course project design* - *Instructor support*	Personalized Course Design - *Learning pathways* - *Content alignment*
	Feeling of Competence	Course project - *Flexibility* -*Authenticity* -*Relevance*	Course project - *Flexibility* -*Authenticity* -*Relevance* Personalized Course Design - *Learning pathways* - *Challenging Content*
	Feeling of Relatedness	Interaction with instructors Lack of interaction between students	Interaction with instructors Lack of interaction between students
	Intrinsic Motivation	Instructors' facilitation Curriculum relevance	Personalized reading Curriculum relevance

Table 4.11 continued

Online Learning Engagement (Research Question #2)	Engagement	Online instructors Course project Feedback	Online instructors Personalized readings Course project Feedback
	Disengagement	Online discussion board	Online discussion board
Online Course Design and Instructional Approach (Research Question #3)	Perceived Learning & experiences	Students Unsatisfied with the Course Content and Course Approach.	Personalized learning approach Learning choice Learning interests Personal goals Learning control Deeper Learning

Merging and Comparing Results

A convergent parallel mixed-methods design was applied to merge and compare

quantitative and qualitative findings to achieve convergent or divergent conclusions that explain

the effect of the personalized learning as an instructional approach on graduate students' self-

determination and online learning engagement (Creswell & Plano Clark, 2011). Both data sets

were treated as equally important to answer the study's research questions. Table 4.11 shows the

comparison and the merged quantitative and qualitative findings. The quantitative data consist of

hypothesis testing using means and GLM. Qualitative data analysis revealed themes (*e.g.*,

students unsatisfied with the course content and course approach) and factors (*e.g.*, course

project) and were compared between the two courses to understand the effects of personalized

learning.

Table 4. 12 *Comparison Between Quantitative and Qualitative Results (Questionnaires and Participant Interviews)*

Dimension		Quantitative (n=64)	Qualitative (n=8)	
Methods & Study's variables	Subthemes	Hypotheses	Course Types	Themes, subthemes, and factors.
SDT (Research Question #1)	SDT Autonomy	Significant effect and increase	Personalized Course	Personalized Course Design - *Learning pathways* - *Content alignment*
			One-size-fits-all course	Course Project - *Course project design* - *Instructor support*
	SDT Competence	Not Significant (neither increase or decrease)	Personalized Course	Course project - *Flexibility* -*Authenticity* -*Relevance* Personalized Course Design - *Learning pathways* - *Challenging Content*
			One-size-fits-all course	Course project - *Flexibility* -*Authenticity* -*Relevance*
	SDT Relatedness	Not Significant (neither increase or decrease)	Personalized Course	Interaction with instructors. Lack of interaction between students.
			One-size-fits-all course	Interaction with instructors. Lack of interaction between students.
Online Learning Engagement (Research Question #2)	Engagement (skills, participation, emotion, and performance)	Not Significant (similar mean)	Personalized Course	Online instructors Personalized readings Course project Feedback
			One-size-fits-all course	Online instructors Course project Feedback (Disengagement) Online discussion board

Table 4.12 continued

Online Course Design and Instructional Approach (Research Question #3)	Online Learning Experience	Significant increase in students' experiences	Personalized Course	Personalized learning approach Learning choice Learning interests Personal goals Learning control Deeper Learning
			One-size-fits-all course	Students Unsatisfied with the Course Content and Course Approach.
	Experiences with course Instructors	Significant increase in students experiences with instructors	Personalized Course	Instructors' facilitation
			Personalized Course	Instructors' facilitation

The comparison between the quantitative and qualitative findings indicated convergence and divergence between the study's data sets. Convergent results were found for the feeling of autonomy, positive learning experiences with the personalized learning approach, and satisfaction with the online instructors' teaching and facilitation of the online courses. Both data sets indicated that personalized learning had a significant effect on supporting students' perceived feeling of autonomy. Divergent results were identified for the perceived feeling of competence. The quantitative data did not reveal a significant effect of the personalized learning approach on supporting students' feeling of competence. The quantitative results showed that students in the personalized course had a higher mean of feeling of competence in the posttest comparing with the control group, but it was not significantly increased when controlling for the pretest as the covariate. However, the qualitative data showed that the personalized course design supported students' feeling of competence and satisfaction with their competence. Convergent results were found for the feeling of relatedness. Both the quantitative and qualitative results

revealed that personalized learning did not support students' feeling of relatedness in online learning courses. The students felt frustrated about their connections with other students in the courses. They thought their feeling of relatedness was only supported by the instructors but not their peers.

The convergent parallel findings also revealed divergent results on the effect of personalized learning as instructional approach on students' online learning engagement. Quantitative data did not reveal significant increase of personalized learning approach on increasing students' online learning engagement. The results showed that students had similar level of engagement to students' engagement in the one-size-fits-all course as well as similar to their pretests engagement. This indicates that students had higher engagement in their online course prior joining the one-size-fits-all course or the personalized course. Although the quantitative results did not showed effect of personalized learning approach on students' engagement, the qualitative findings suggested that this approach can impact students' online learning engagement. Particularly, personalized readings was found to be engaging for students in online courses. Students also indicated that they were engaged because of their instructors, the effective feedback, and the course project (See Table 4.10).

The convergent parallel findings also revealed that the quantitative and qualitative data sets were convergent to reveal the effect of the personalized learning approach on students' learning experiences. Both data sets indicated that students perceived a higher positive learning experience in the personalized course comparing with students in the one-size-fits-all course. Students in the personalized course had higher mean (M = 4.10) than students in the one-size-fits-all course (M = 3.50) did. The qualitative findings also revealed that the personalized course supported students' learning choices, needs, and interests and allowed for learning control. They

indicated that the personalized course met their personal learning goals and supported their deeper learning. Finally, both data sets indicated that students had positive perceptions toward instructors in the personalized learning course. Quantitative findings showed students in the personalized course had a higher mean ($M = 4.50$) of perceptions toward their instructors comparing with students in the one-size-fits-all course ($M = 3.50$). Both instructors taught the course as a one-size-fits-all course and as personalized course.

Chapter Summary

This chapter presented the analysis and findings from both the quantitative and qualitative analyses using parallel mixed methods to reveal whether the findings converge or diverge. The researcher applied a quasi-experimental design to set the experimental groups and collected pretest, posttest, and controlled data to investigate the effect quantitatively. At the end of the course, the researcher conducted semi-structured interviews of both the experimental and control groups to investigate students' perceptions and experiences in the online courses. Means and general linear modeling (GLM) were performed to test the hypotheses. Themes were analyzed qualitatively to compare students' perceptions from the one-size-fits-all course with their perceptions from the personalized course. Comparing the quantitative findings with the qualitative findings revealed both convergence and divergence.

CHAPTER 5: DISCUSSION AND IMPLICATIONS

The purpose of this study was to investigate the effect of personalized learning as an instructional approach on students' self-determination, intrinsic motivation, online learning engagement, and online learning experiences. The researcher studied personalized learning as the intervention that could motivate and engage learners in online learning courses. This chapter presents the discussion of the findings that were presented in Chapter 4. It also presents practical implications for how personalized learning can be designed and implemented effectively. Finally, the chapter presents the results conclusion and recommendations to future research.

Discussion

Personalized Learning

The personalized learning approach derived its principles from theories that support learner control and independence of learning, and it focuses on the learner-centered paradigm (Watson & Watson, 2017; Rickabaugh, 2012). Personalized learning provides a customized learning environment in higher education and online learning environments (Lessor, 2016; Redding, 2014b). It prioritizes every learner's needs and interests and allows for tailoring and adjusting the learning experiences to meet their personal learning goals. Personalized learning principles can be implemented to design and develop a course curriculum that allows students to learn independently and progress on their own. Personalized learning encourages students to be active learners and allow for learning control. The approach also emphasizes setting personal learning goals and progressing independently by coauthoring with instructors (Watson & Watson, 2017; Rickabaugh, 2012; Watson, Watson, & Reigeluth, 2012; Lessor, 2016; Redding, 2014b).

In this study, both the quantitative and qualitative findings showed the effectiveness of implementing personalized learning principles in online learning courses. Overall, the qualitative results showed that the personalized course contributed to support students' self-determination (autonomy and competence), intrinsic motivation, and online learning engagement. The quantitative results showed that the personalized learning approach supported students' autonomy, increased their positive learning experiences, and increased their positive perceptions toward the online course instructors. The participants found the personalized course to be effective because it met their learning needs, provided instructional content that aligned with their learning choices and interests, enhanced their interest in the topic, and engaged them during the course time. Therefore, the results showed that personalized learning as an instructional approach contributed to students' learning in online courses.

The personalized course allowed students to select their own learning direction and project topic as well as the readings that suited their needs and interests. The results clearly indicated that this course was helpful because it differentiated between what they needed to learn and what they could optionally learn, which was one of its goals. This finding aligns with what the literature discussed: the lack of choices in a learning environment is a factor that weakens students' perceived feeling of autonomy (Hartnett, 2015). Cordova and Lepper (1996) recommended providing choices to support students' motivation, enhance their learning control, and increase their self-determination and especially their feelings of autonomy and competence.

The results also showed that the course enhanced students' learning interests and most importantly allowed them to follow the course pathway that interested them. Research has shown that aligning the content with students' interests results in better learning (Hidi, 1990; Renninger, Hidi, & Krapp, 1992; Schank, 1979), engagement (Ainley et al., 2002), and motivation (Deci &

Ryan, 2000) as well as increased cognitive and affective functioning (Ainley et al., 2002). These findings align with Watson's and Watson's (2017) theory that personalized instruction benefits learners by meeting their learning interests.

Watson and Watson (2017) indicated that personalized instruction helps learners meet their personal goals. In this study, the results showed that the personalized course assisted students in meeting their own learning goals. All students were encouraged to set their personal goals at the beginning of the course and revisit them at the end of the course to see whether the course design and content helped the students meet those goals (ZPD) (Vygotsky, 1978). It was found that the personalized course can help students set goals and plan their learning effectively by working with clear vision toward their achievements.

The results showed that students agreed that the personalized course allowed them to be independent and take control of their learning—and lead—the learning process. They reported that the course allowed them to select the pathway, assignments, and readings that suited their learning interests and choices. Personalized learning literature suggested that providing personalized instruction and experiences enhances students' learning control and independence (Barr & Tagg, 1995; Demski, 2012; Watson & Watson, 2017), which the results of this study confirm. While some researchers suggested allowing students full control over their learning, others suggested providing limited control instead (Barr & Tagg, 1995; Demski, 2012; Watson & Watson, 2017). In this study, the researcher provided a moderate level of control to students, and the instructors were in charge of assessment and evaluation to ensure the learners remained within the course parameters and met the course objectives. Even though the personalized course only offered a moderate level of control, students felt they had the opportunity to control their learning and be independent learners.

Finally, deeper learning was one of the critical goals the researcher aimed achieve in this personalized course design. The results showed that most students agreed that the personalized course helped them learn deeply. The results also showed that the learning pathway design assisted students with learning deeply by aligning the content with their needs and interests. Interviewees similarly mentioned that the *course project* was another factor that facilitated their deeper learning. These results align with Zheng's (2018) proposal that designing and developing personalized learning experiences enhances students' deeper learning and information processing.

In an online learning environment, students typically come from different backgrounds and with different learning needs and interests. Accordingly, treating those students as if they all have one focus is not an effective teaching approach. The findings showed that the one-size-fits-all model can be effective when there are no differences between students' backgrounds and learning needs. When students with different learning backgrounds, focuses, and needs are included in a course, instructors and instructional designers should create courses that are *personalized to the learner* to address students' learning needs. In this study, the one-size-fits-all course was effective and provided positive experiences only for students who had interests and needs in K–12 settings. However, the results clearly indicated the difficulty of aligning the course focus with other students' learning needs and personal goals, especially for those who had interests in higher education or corporate training.

Personalized learning courses are ineffective without instructors who facilitate the students' learning. The researcher drew a plan for instructors to teach and facilitate the personalized e-learning course. The plan detailed the following: instructors should (1) support students' personalization of their assignments and provide personalized resources as needed; (2)

provide individual scaffolding and facilitation as well as interact with individuals; and (3) provide feedback and evaluation personalized to learners in the course. Therefore, the quantitative findings revealed significant differences between students' perceptions toward the instructors in each course, even though the same instructors taught both courses. This indicates that students in the personalized course held higher positive perceptions toward their instructors because they felt supported in meeting their personal learning goals and that their learning needs and interests were valued.

The qualitative findings showed that instructors from both courses were flexible, aware of students' interests and learning needs, and effective communicators. The results from the one-size-fits-all course showed that the instructors assisted students with aligning the course project to meet their needs, which reflected on their self-determination and engagement. The *students unsatisfied with the course content and course approach* theme presented evidence that most of the interviewees remained in the one-size-fits-all course because of the effectiveness of their instructors' teaching and facilitation and their desire to devote time and effort to each learner to provide feedback and guidance on completing the course effectively. This indicates that the instructors played a critical role in engaging and motivating learners in the online courses. Conversely, Hartnett (2015) found that "perceptions of insufficient guidance and feedback from the lecturers in the online environment emerged as a highly salient theme that undermined several participants' need to feel capable" (p. 92).

Even though online courses are designed to give independence to students, instructors still play important roles in supporting students' feelings of self-determination and motivation. Instructors also were found to be an important factor for engaging students in online learning courses. Even the personalized course was designed to promote students' learning; support their

feelings of autonomy, competence, and relatedness; and engage them more effectively, this cannot occur without effective and skilled instructors who maintain strong relationships with students and pay attention to their learning needs and interests. It was found that the level of care instructors demonstrated for students' learning reflected on their feelings of competence and relatedness, which in turn reflected on their intrinsic motivation and led to better and more effective learning.

Deci et al. (1996) discussed that the instructor should incorporate informational feedback in the learning context to support students' feeling of self-determination and their learning in general. In both course types—personalized and one-size-fits-all—the instructors provided feedback on the assignments. However, in the personalized course, instructors were guided to provide students with personalized feedback to address their learning differences and backgrounds, which Zheng (2018) discussed. Therefore, the results showed that instructor feedback was a really important factor for online learning in both courses. The results from the personalized course showed that most students were satisfied and cared a lot about the feedback they received from instructors, and they showed evidence of their understanding of that feedback's impact on their online learning. Providing feedback to learners with specific tips that address their needs and interests has a higher impact on their learning.

Self-Determination Theory

One of the main purposes of this research was to identify the potential of personalized learning as an instructional approach to provide learners with relevant and personalized learning experiences that address their interests and needs, which reflect on supporting their self-determination (feelings of autonomy, competence, and relatedness) (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). It was the researcher's hope to see an increase in students' feelings of

autonomy, competence, and relatedness, which would reflect on their intrinsic motivation that should lead toward effective and positive e-learning experiences. These three SDT components are additive and correlate with each other to increase or decrease learners' intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). Supporting these three components can increase intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000), which was a goal of this study.

Autonomy and competence. Autonomy is the feeling associated with the amount of learning control students feel within a learning environment (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). This type of feeling associates with learning performance and intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). The perceived feeling of autonomy null hypothesis was: "personalized learning as an instructional approach has no statistically significant effect on students' perceived feelings of autonomy." The results showed that personalized learning as an instructional approach could significantly increase and support students' perceived feeling of autonomy.

Competence is the feeling of confidence when a student has the needed skills to work and complete an assigned learning task (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). The perceived feeling of competence null hypothesis was: "personalized learning as an instructional approach has no statistically significant effect on students' perceived feelings of competence." The results showed that personalized learning as an instructional approach could not significantly increase and support students' perceived feeling of competence. This might indicate that students did not understand the new structure of the course (personalized learning course), which was completely differed from other online courses in their online degree program. Similar to previous studies, Jang, Reeve, and Deci (2010) and Rienties et al. (2012) found that a positive structure

that deals with the amount of quality, quantity, and clarity of information and instructions in the learning environment can support students' feeling of competence (as cited in Hartnett, 2015).

However, the qualitative findings showed that course project was a well-designed assignment to support students' feelings of autonomy and competence within the two course types (one-size-fits-all and personalized). The interviewees from the personalized course mentioned that the personalized learning components (*e.g.*, personalized learning pathways, personalized readings, and personalized feedback) supported their feelings of autonomy and competence. Therefore, the qualitative findings showed that the personalized course was successful at supporting students' feelings of autonomy and competence. Students were given the opportunity to think about their learning focus and follow the pathway that addressed their learning needs, which supported their feelings of autonomy and competence. The findings showed that students enjoyed their learning in such an environment and felt autonomous and competent due to their control over their online learning. It was also found that personalized learning as an instructional approach in online courses provided opportunities for students to be independent learners who perceived their learning to be personalized.

Themes that appeared from the one-size-fits all course confirmed that these kinds of online courses can only be effective for those whose learning needs and interests they meet; the rest of the students are left to learn about topics and areas for which they have no potential interests or needs. Thus, the findings showed that students in the one-size-fits-all course felt autonomous and competent with only support from the instructors, but they were not supported by the course design or learning content. Previous research has shown that a lack of alignment between students' personal goals and interests and the learning tasks can result in weakening

their perceived feeling of autonomy (Hartnett, 2015), which result in demotivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000).

Relatedness. Relatedness is the feeling of belonging to the social environment (*e.g.*, an online learning environment) and maintaining a closer relationship with other students or instructors (Garn & Jolly, 2013; Kowal & Fortier, 1999). The perceived feeling of relatedness null hypothesis was: "personalized learning as an instructional approach has no statistically significant effect on students' perceived feelings of relatedness." The results showed that personalized learning as an instructional approach could not significantly increase and support students' perceived feeling of relatedness. The qualitative results did not show differences in the extracted themes from both courses. The emerged theme of *lack of interaction between students* indicated that students did not feel related to others in the course environment because of their interactions with other students in the course. Similarly, Hartnett (2015) found that students lacked interaction in online learning courses because they tended to interact and reached out to other students if they saw them as potential study partners. Therefore, personalizing the discussion board might isolate students and limit their interaction. Students felt that their interactions with their peers lacked meaning, and they did not feel engaged in discussions (Howland & Moore, 2002; Sung & Mayer, 2012). Satisfying students' basic psychological needs is required for enhancing their intrinsic motivation and supporting their well-being within the social learning environment (Deci et al., 1991; Cordova & Lepper, 1996; Stefanou, Perencevich, DiCintio & Turner, 2004), and a personalized learning approach can be one of the solutions for achieving this, especially within online learning courses.

However, the *communication with instructors* theme suggested that instructors were successfully able to communicate and enhance students' feeling of relatedness to the course

environment. Almost all interviewees mentioned that the instructors supported this type of feeling. The instructors' communications through video recordings was found to be an effective strategy to support students' feelings of relatedness and competence. Instructors from both course types recorded videos to share the weekly announcements and requirements. Students reported that the videos explained the assignments and the learning expectations, which enhanced their feeling of relatedness and increased their feeling of competence. This result aligns with Howland and Moore (2002), who suggested that students feel isolated when they are left without support for interpreting the course assignments. Accordingly, instructors must show an interest in supporting students' learning, which will increase their feeling of relatedness, which will in turn result in increasing their intrinsic motivation (Connell & Wellborn, 1991).

Based on this finding, the researcher attempted to reduce the quantity of the online discussion boards to minimize the workload of weekly assignments and improve students' engagement on other activities that might enhance their feeling of relatedness. The researcher continuously tried to improve the design of this course until achieving a version that could support the three basic psychological needs (autonomy, competence, and relatedness) and engage learners much effectively.

Intrinsic motivation. Students always lack higher intrinsic motivation to achieve better learning (Deci et al., 1991). The results showed that both courses positively affected students' intrinsic motivation but with different factors. In the one-size-fits-all course, the curriculum was not relevant to most of the students, who had interests in areas other than K–12. However, in this course, the instructors tried to assist with students' learning needs and facilitate their learning as they completed the course. Some students benefited from this course and aligned the project and assignments to their learning needs, while others had to go through the course without aligning

the course project or content and just finished out it to earn credits. *Instructors' facilitation*

played a critical role in motivating the learners in the one-size-fits-all course. It was found that

the instructors attempted to provide support and align the course project with students' needs to

enhance their learning experiences. This means that *instructors' facilitation*, which emerged as a

motivating factor, was effective at supporting students' intrinsic motivation from both courses.

In the personalized course, the learning pathways provided a relevant curriculum that

addressed individuals' learning needs without the instructors' assistance and adjustment during

the course delivery, which reflected on students' intrinsic motivation. Students in this course

found the curriculum to be relevant for their learning needs and interests and that it successfully

met their personal choices. *Personalized readings* was another factor that supported students'

intrinsic motivation. It was found that providing *personalized readings* for online learners was

effective and critical for students' learning as well as for their motivation and online learning

engagement. Students liked the idea of personalized readings that aligned with their learning

needs and personal goals. In addition, interviewees indicated that the readings were motivating

because of the direct applications of those readings to their workplaces.

Students in this study had different backgrounds, learning needs, and interests, which

required a personalized course that included a relevant curriculum. A relevant curriculum is a

critical factor in an online learning environment (Park & Choi, 2009), and students lose interest

and motivation when they find the assigned tasks are not relevant to their learning needs or lives

(Park & Choi, 2009). When learners do not find the course content and assigned tasks to be

relevant to their learning needs or to represent what they want to learn, they easily lose interest

and motivation. In this study, the effect of a relevant curriculum appeared to be a critical factor

for intrinsic motivation which might lead to poor learning and students focusing only on earning

course credits and grades. Qualitative findings from the one-size-fits-all course showed that students might just learn things for the sake of grades and finish the course to earn credits rather than seeking to align the course materials and assignments to their needs and interests. It was found that participants from this course lacked a relevant curriculum, but the instructors helped to align and adjust the course content to their needs, which assisted them with completing the course. Park and Choi (2009) found that lack of relevant content and assignments to students' lives might lead to them dropping out of online courses, which confirmed the findings of this study.

Online Learning Engagement

Student engagement comprises the time and energy students devote to their learning (Kuh, 2003). The quantitative findings did not reveal a significant effect of the personalized learning approach on increasing online students' engagement compared with students from the one-size-fits-all online course. Students in the personalized course had almost similar means for their engagement, and they had similar means to their pretests. These results indicated that students were engaged in other courses as well as this course. Even though the personalized learning approach did not increase students' engagement scores, the results showed that it can engage learners as much as one-size-fit-all model in addition to meeting their learning needs and interests.

The qualitative findings revealed several themes identifying the course components that engaged learners in both courses. Interviewees from the personalized course indicated that *personalization* was an engaging aspect for them in online learning. Specifically, they found the strategy of *personalizing the curriculum to their learning needs using the pathway strategy* could successfully provide the content they needed to learn, which engaged them in the course. A

couple interviewees mentioned they might try to implement the idea of personalization in their instructional designing and teaching to provide relevant learning pathways for their learners. They indicated that the idea of personalization in this course engaged them, especially when they found the readings that were provided for their learning needs and interests. In comparison, interviewees from the one-size-fits-all course only mentioned how the course project and instructors' interactions contributed to their engagement.

In a personalized course, it is difficult to implement personalized learning principles in online learning without instructors who are willing to devote time and effort to facilitate students' learning—especially in higher education. The design of the personalized course was only intended to provide content aligned with students' learning needs and interests. However, instructors still play important role in facilitating these courses. The findings showed that flexible instructors contribute to students' engagement. As discussed, instructors are the first factor that engages students in both courses.

Most students from both courses did not enjoy the discussion boards. Even after personalizing them, students reported the same perspectives regarding their engagement. Lessening discussion assignments and increasing student communication through different strategies such as grouping students by their interests and learning needs might be effective for engaging learners. This strategy was implemented in the second iteration of the personalized course to engage students with each other so they could feel related and that they belonged to the environment. Hampton and Pearce (2016) indicated that supporting students' relationships and connection prevents feeling of isolation and disconnection within online courses.

The discussion board was not perceived to be effective strategy for enhancing students' feeling of relatedness. When designing a discussion board, it is assumed that students will be

connected and feel related to the environment. However, the quantitative and qualitative results of this study indicated that students did not feel related to the learning course environment, and the discussion board was not an effective strategy for engaging learners socially and supporting their feeling of relatedness. Unfortunately, online courses are being designed with many discussion boards that overwhelm students with the workload.

Most interviewees and participants also reported that working on the course project (individually) was the most engaging course component to them. The findings showed that all students from both courses preferred the individual project over all course assignments and activities. These findings indicated that learners preferred interacting with each other in online context, but not working together on a group project for submission as a single project. This finding supports the idea that personalization within online courses provides a beneficial learning environment for students. In most cases, students do not know each other personally, and grouping them in a project might not work effectively. Therefore, it is advisable to design personalized online courses that include individual projects from which students interact and share their perceptions rather than assigning students to work together on group projects.

Implications

This study provides implications for implementing personalized learning as an instructional approach to support students' self-determination and increase their intrinsic motivation and engagement in online higher education. These implications apply to online learning course design and delivery methods. The implications can also be applied to face-to-face course design and teaching strategies in higher education.

Personalized Learning

The personalized learning approach can provide graduate students with unique learning opportunities by allowing them to focus on their personal goals and learning needs. Personalization principles can be utilized and implemented to design, develop, and deliver an online course to provide relevant and tailored online learning content that can intrinsically motivate students and engage them through personalized learning pathways. The personalized learning principles that were implemented in this study showed an effect on students' self-determination and online learning engagement, and they provided students with the opportunity to meet their own learning goals, interests, and learning needs. These principles also assisted the researcher with providing learning choices to students and allowing them to follow whatever suited their learning needs.

The intervention in this study provided a personalized course through two dimensions: course curriculum (learning pathways, assignments, readings, and discussion boards, etc.) and instructors (feedback, assessment and evaluation, interaction, and facilitation, etc.) (See Figure 2.3). The course curriculum was personalized by the researcher using the *personalized to learner* strategy to set three learning pathways. These pathways included personalized content that would suit every individual who might join the course. The second dimension was personalization through instructors to facilitate and scaffold students' learning and personalize the course for every individual. Instructors were provided with a training plan and documents that explained how to implement personalized learning and work with individuals to tailor the course to their needs. These two dimensions were effective at providing positive learning experiences for all learners in the course. Therefore, students turned to instructors when they need help, and instructors responded to every individual and worked closely with them to meet their learning

needs and interests. The results show that instructors play an important role in personalized learning implementation. Without effective instructors who are willing to devote time and effort to every individual in the course, personalized learning is not an effective approach to delivering online courses. Instructors' communication and interaction also are critical components in personalized learning courses. In addition, instructors must be available to provide ongoing cycles of feedback and assessment to ensure students are on the right track to meet the course objectives.

When a course includes students from different areas (K–12, higher education, and corporate), it should be designed using personalized learning as the approach to address their differences. Online courses should be relevant and align with students' learning needs and interests, so they can represent the reality of their future. Personalized learning emphasizes that students should be at the center of the learning process and create opportunities for them to take control of their learning. The intervention in this study aimed to provide this opportunity to learners, and the design of this intervention relied on encouraging students to take control and direct the focus of their learning toward their needs.

For online educators, this study informs us that personalized learning can increase students' positive online learning experiences and increase their perceptions toward their online instructors. The results also suggest that personalized learning as an instructional approach can provide a flexible course that meets individual learning needs and interests. It was found that personalized learning supported students' feelings of autonomy and competence to plan and drive their own learning. Students in the learning design and technology fields come from different areas with different interests and learning needs. Therefore, the results of this study suggested that providing a one-size-fits-all course that focuses on K–12 context is ineffective for

many students who join it. A solution to this issue is to provide a personalized learning course that can be aligned with all students' learning needs and interests.

In the personalized course, students were motivated and engaged because of the personalized readings that were provided to them. The results imply that personalizing the readings can motivate learners and increase their reading engagement. Many of the participants explicitly stated that they were going to apply the course readings in their professional settings immediately, and the results showed that students could see the alignment between their learning and their job contexts, and that they found the readings could be applied easily in their teaching and designing practices.

Finally, the results showed that personalized learning as instructional approach can support learners' interest, needs, preferences, and choices. Online learners are adults, and they must be treated as independent learners who are able to drive their learning choices. Thus, allowing for learning control and independent learning opportunities can lead to more effective learning environments that result in motivated and engaged learners.

Self-Determination Theory

For online educators, the qualitative results suggested that personalized learning as an instructional approach can support online students' self-determination and intrinsic motivation. The results of this study inform online instructors and instructional designers about the implementation of personalized learning as an instructional approach to support students' feelings of autonomy and competence. Utilizing personalized learning principles to design online learning courses was found to contribute to students' feelings of autonomy and competence, which increased their intrinsic motivation. For example, this study found that the *personalized course design* as a whole, *aligned content* through multiple *learning pathways*, and allowing

students to select what suited their learning contributed their feelings of autonomy and competence. The course project—when broken into smaller pieces and with support from instructors (*e.g.*, feedback and assessment)—can contribute to students' feelings of competence and autonomy, which results in their successful completion of the project and the course. Finally, personalizing the readings contributed directly to motivate learners intrinsically. Online learning stakeholders might implement personalized learning principles to design online courses that incorporate those instructional activities and strategies, which was found in this study to support students' feelings of competence and autonomy.

In both online courses, the students did not feel connected and related to each other. The personalization of the course contributed to student isolation. The researcher assumed that online discussion boards would contribute to students' interactions and feeling of relatedness because they could work closely with each other. But the students did not find the personalization of discussion boards to support their feeling of relatedness. Therefore, online discussion boards were not an effective strategy to increase students' interaction and communication in both online courses. A solution to this issue is to eliminate discussion boards and provide different strategies that can increase students' feeling of relatedness. For example, instructors can provide an alternative strategy such as an *area of interaction* where students can interact and communicate with each other without the obligations of completing weekly discussion posts. Students who enjoy interacting with others will do so, which could increase their feeling of relatedness. Another alternative strategy is to provide optional discussion threads for those who enjoy interacting through them but without requiring them for each learner in the course. Most participants did not like the online discussion boards, which led the researcher of this study to

reduce the amount of the posts to increase interaction and the feeling of relatedness to the learning environment.

Online Learning Engagement

For online educators, the study's results suggested that personalized learning as an instructional approach has an effect on online learning engagement. The quantitative results suggested that the personalized learning approach can engage students as much as the one-size-fits-all approach does but without a significant increase. The qualitative results suggested that a personalized course design using learning pathways engages learners under one condition: *effective instructors' facilitation*. The study found that instructors' flexibility and willingness to personalize the course to learners played a critical role in providing personalized courses to engage online learners. Instructors were supposed to communicate and interact with individuals and provide personalized learning experiences (*e.g.*, feedback, assessment, additional resources, facilitation, and scaffolding). Learners could modify the course assignments and focus on what best suited their learning, and the instructors supported them in setting and meeting their personal goals. Therefore, these instructional strategies and activities were found to be effective at engaging learners in online courses and resulting in positive learning experiences. Most participants indicated that the course was a positive experience that engaged them effectively.

Additionally, instructors' interacting and communicating with students and providing constructive feedback contributed to students' learning in the personalized course. The qualitative results also suggest that personalized reading contributes to students' engagement. Finally, the qualitative results indicated that the course project was a contributing factor to engage learners for three reasons: (1) *allowing learners to progress based on their time*; (2) *allowing learners to control their learning progress*; and (3) *breaking the course project into*

smaller assignments with instructors' feedback throughout the course. The qualitative findings revealed that the quantity and quality of the online discussion boards should be managed to the appropriate level to engage learners. The results suggested that overwhelming online students with discussion boards for the sake of engagement or increased interaction may not be effective and should be reduced to a minimal level to avoid creating obligations to participate in those assignments.

Finally, the study findings suggest that when educators allow for more learning control and independence—which are the core principles of the personalized learning approach—it is highly likely that students will be engaged in their learning. The participants enjoyed the course design and felt that it engaged them throughout their learning in the personalized course.

Limitation and Delimitation

Implementing personalized learning principles in a structured online learning program that provides only one-size-fits-all courses was the foremost challenge to this experimental study. The online courses that were investigated in this study were parts of an online learning program that provides one-size-fits-all courses that focus on one direction of the course despite differences in students' background learning needs. Students were used to learning from one course format during the entire program, and providing a different format could have confused them. However, the researcher worked closely with the instructors to address these challenges and provide a personalized course that provided different learning pathways that included multiple reading options, modality of learning materials, personalized assignments, and rapid and personalized feedback.

Another challenge to implementing a personalized course was the instructors, who were used to teaching one-size-fits-all courses. However, the researcher and the leading professor for

those courses provided training sessions for the instructors on how to teach personalized courses and deal with students' differences within one course. As indicated by the results of this study, the instructors played a critical role in implementing this personalized course. Instructors must understand the students' needs, provide individualized feedback that meets them, and care about their feelings to engage and motivate them.

It was also difficult to implement a self-pacing principle in online courses. The program does not allow for course designs that are not mainly time-based. However, the researcher developed the "Proposed Personalized Assignment Plan" template for students who wanted to personalize the course assignment and adjust the focus and the due dates based on their learning needs but within the course parameters and overall course time. This way, students could work collaboratively with their instructors to negotiate their learning and tailor the course to their learning needs.

Individualizing the instruction could have been a negative experience for some learners who enjoy learning from others. Some students in the personalized course indicated that they enjoyed learning from other students, but the course did not focus on collaborative work because most students identified their individual projects to be the most effective strategy for supporting their learning. Interviewees from the personalized course found the learning pathways to be effective and helpful for their learning, but this might decrease their interaction with other students from different pathways. When the enrollment in the course is low, it results in fewer students in each learning pathway. This decreases students' interactions, which results in a negative impact on their feelings of relatedness and belonging in the course. However, in the second course implementation, the researcher attempted to register more than two students in the

course sections with same learning interest (*e.g.*, K–12, higher education, or corporate training) to increase interactions among them.

The researcher is the instructional designer who designed the personalized course and accordingly holds theoretical dispositions toward personalization. This theoretical disposition might have caused bias and influenced the interpretations toward positive results that favor personalization in online learning, which threatens the validity of the results. However, the researcher used well-developed scales to measure the effect of personalized learning in online learning courses. The researcher also used verbatim quotations from the interviews for both courses to objectively present students' perceptions of their experiences, feelings, and perceived learning. The researcher included both negative and positive experiences to reveal how students experienced these two courses.

Researchers have not extensively investigated the effectiveness of personalized learning as an instructional approach in online learning courses. The study's literature review identified a lack of empirical studies, which it identified as a research gap that should be addressed. In the beginning of this study, it was challenging to base the instructional design decisions on empirical studies. Therefore, the researcher investigated the literature and used the theoretical studies that supported the design, development, and implementation of personalized learning in online learning courses.

Recommendations for Future Research

Little empirical research has been conducted to investigate the effect of personalized learning as an instructional approach on online learning courses. This study aimed to examine the effect of personalized learning on graduate students' intrinsic motivation and online learning engagement. The study utilized STD to investigate their intrinsic motivation from three

perspectives (autonomy, competence, and relatedness). It also intended to investigate the level of

online learning engagement that personalized learning may support during one online course.

However, because personalized learning is still emerging in higher education, it requires further

investigation to develop effective course designs that meet individuals' learning needs, interests,

and backgrounds.

Because this study was conducted to examine the effect of *personalized to the learner*

online course design, further studies should be conducted to examine the effect of *personalized*

with the learner and *personalized by the learner* designs on the same dependent variables that

were investigated by this study. These different learning environments have different effects,

which should be investigated further. In addition, it would be advisable to investigate the effect

of personalized learning on other outcome variables (*e.g.*, learning achievements, cognitive

engagement, self-efficacy, and learning independence).

This study was conducted in an online learning program that offers one-size-fits-all

courses in which students are treated as if they all have similar interests, backgrounds, and

learning needs. The one-size-fits-all courses require students to progress at time-based rather

than self-progress paces. This design model does not many learners needs, interests, and

backgrounds. Thus, personalization can be a solution to such design issue to allow higher

education learners to control their learning and progress based on mastering their competencies

rather than progressing in a time-based manner.

The researcher could not provide a fully personalized online course that allowed students

to progress on their own time. It is recommended that this obstacle be addressed to allow

students to control their learning to support learning choices, interests, and needs and align with

their learning backgrounds. It is also recommended that this study should be replicated in an

online program that allows for full control of learning progress and investigates students'

learning achievement, motivation, engagement, and other outcome variables associated with

personalized learning.

This study was conducted in an online learning program, and it is recommended that the

personalized course design model be implemented in face-to-face course for both graduate and

undergraduate students. In addition, this study could only include a small sample size to

investigate its variables quantitatively, so it is recommended that the study should be replicated

with larger sample sizes to validate the results and generalize the design model findings to

settings other than online learning.

This study did not focus on investigating personalized learning approach implementation

challenges in online learning programs. Therefore, personalized learning challenges should be

researched and addressed to achieve a personalized course design that can be applied in online

learning courses. Finally, implementing a personalized learning approach with appropriate

learning technology (adaptive learning technology, competency-based technology platforms,

digital badges, etc.) might provide different learning experiences for online learners, and it must

be investigated to reveal the best practices of this approach with instructional technology

support.

Conclusion

The researcher conducted a convergent parallel mixed-methods approach to investigate

the effect of personalized learning as an instructional approach on graduate students' self-

determination, intrinsic motivation, online learning engagement, and online learning experiences.

Comparing the mixed methods, results showed that the quantitative and qualitative data are

convergent and divergent. The two data set results converged to confirm that the personalized

learning approach can increase and support students' autonomy, increase their positive online learning experiences, and increase their perceptions toward their online instructors. The two data sets diverged on students' feelings of competence and relatedness as well as their online learning engagement.

The quantitative results suggested that personalized learning as an instructional approach had a significant effect on students' feeling of autonomy, supported their online learning experience significantly, and increased positive perceptions toward their online instructors. The qualitative findings showed that students felt autonomous and competent when they received personalized learning as an instructional approach. The interviewees revealed that they did not feel connected to their peers and considered the online discussion boards to be disengaging and demotivation factors. However, students felt connected and related to their instructors. They felt that the instructors were motivating and contributed to their feeling of relatedness. The study also concluded that personalized learning as an instructional approach contributed to students' intrinsic motivation. The quantitative results did not reveal any significant effect of the personalized learning approach on students' engagement, while the qualitative results suggested that the approach had an effect on engaging online learners effectively when the aligned the course content with their learning needs and interests.

The qualitative results also showed that when provided with online courses that address students' individual learning needs and interests, students most likely will perceive higher feelings of autonomy and competence, which will increase their intrinsic motivation. It was found that providing an appropriate amount of online discussion boards might engage learners in online learning courses. Requiring weekly discussion posts might disengage learners and distract their efforts. Online discussion boards were not a successful factor for engaging learners, and

even personalizing the discussion board did not help to connect students with each other. It was concluded that weekly announcements and instructor-students communication were factors that supported students feeling of relatedness and competence.

The study concluded that the implemented personalized learning principles showed a positive effect on online students' self-determination, intrinsic motivation, and online learning engagement. The study also concluded that personalized learning as an instructional approach can provide positive online learning experiences and support positive perceptions toward online instructors. When the participants found that the course was designed to meet their interests and needs, they were engaged and motivated to learn and perceived higher positive online learning experiences. Students were satisfied with their learning experiences because they met their learning needs and interests during the personalized course. Almost all students enjoyed their personalized learning experiences, which indicates students like this approach if it is implemented accurately and effectively. However, more research investigating the effectiveness of this approach on other dependent variables (*e.g.*, self-directed learning) is warranted. It is recommended that online course designers consider designing online courses using personalized learning as instructional approach to support students' learning control, learning interests, and choices that will result in higher learning engagement and increase motivation.

Chapter Summary

This chapter presented the results discussion, implications for educational practices, limitations and delimitations, recommendations for future research, and results conclusion. The study concluded that personalized learning as an instructional approach has an effect on graduate students' self-determination, intrinsic motivation, and online learning engagement. The study concluded that the personalized course design model has the potential to change the one-size-

fits-all course design that has been dominant in online learning programs. The findings of this study have educational implications for online learning course design, personalization in higher education, SDT in higher education and online learning courses, and online learning engagement. The findings can inform online instructors and administrators about implementing the personalized course design model that was investigated in this study.

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APPENDIX A. IRB

PURDUE
UNIVERSITY

HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To:	VICTORIA WALKER BRNG
From:	JEANNIE DICLEMENTI, Chair Social Science IRB
Date:	01/14/2019
Committee Action:	Expedited Approval for Renewal - Category(6) (7)
IRB Approval Date	01/14/2019
IRB Protocol #	1802020247
Renewal Version	Renewal-001: Renewal-001:
Study Title	Effects of Personalized Learning Approach on Students' Motivation, Engagement, and Self-Efficacy
Expiration Date	01/13/2022
Subjects Approved:	300

The above-referenced protocol has been approved by the Purdue IRB. This approval permits the recruitment of subjects up to the number indicated on the application and the conduct of the research as it is approved.

The IRB approved and dated consent, assent, and information form(s) for this protocol are in the Attachments section of this protocol in CoeusLite. Subjects who sign a consent form must be given a signed copy to take home with them. Information forms should not be signed.

Record Keeping: The PI is responsible for keeping all regulated documents, including IRB correspondence such as this letter, approved study documents, and signed consent forms for at least three (3) years following protocol closure for audit purposes. Documents regulated by HIPAA, such as Authorizations, must be maintained for six (6) years. If the PI leaves Purdue during this time, a copy of the regulatory file must be left with a designated records custodian, and the identity of this custodian must be communicated to the IRB.

Change of Institutions: If the PI leaves Purdue, the study must be closed or the PI must be replaced on the study through the Amendment process. If the PI wants to transfer the study to another institution, please contact the IRB to make arrangements for the transfer.

Changes to the approved protocol: A change to any aspect of this protocol must be approved by the IRB before it is implemented, except when necessary to eliminate apparent immediate hazards to the subject. In such situations, the IRB should be notified immediately. To request a change, submit an Amendment to the IRB through CoeusLite.

Continuing Review/Study Closure: No human subject research may be conducted without IRB approval. IRB approval for this study expires on the expiration date set out above. The study must be close or re-reviewed (aka continuing review) and approved by the IRB before the expiration date passes. Both Continuing Review and Closure may be requested through CoeusLite.

Unanticipated Problems/Adverse Events: Unanticipated problems involving risks to subjects or others, serious adverse events, and serious noncompliance with the approved protocol must be reported to the IRB immediately through CoeusLite. All other adverse events and minor protocol deviations should be reported at the time of Continuing Review.

APPENDIX B. INTERVIEW PROTOCOL

Exploratory Questions:

1. Tell me about yourself.
2. What are your dreams for your career?
3. How would you describe yourself as an online learner?
4. Describe your learning approach in online courses?
5. What are some challenges you have faced as a learner in higher education? In online learning in particular?
6. What helps you succeed as an online learner?
7. How have instructors helped you engage with online learning?
8. What role do peers play in online learning?
9. What role does instructional content play in online learning?
10. Can you describe your learning experience in the EDCI 568 course?

Motivation, Demotivation, and Engagement:

1. Were there any motivating factors for you in this course?
    a. What were those factors?
    b. How were these factors motivating for you?

2. Were there any factors in the EDCI 568 course you found engaging?
    a. What were those factors?
    b. How were these factors engaging for you?

3. Were there any factors of the course that were demotivating to you?
    a. What were those factors?
    b. How were these factors demotivating for you?

Self-Determination Theory Questions:

Terms and Definitions:

During this part of the interview, I am going to provide you with a few terms and their definitions and then ask you a few questions related to those terms.

1. Term and definition: Autonomy is a term that refers to the feeling that you have control over your learning and you are an independent and self-regulated learner.

a. Do you think that the EDCI 568 course supported this feeling and allowed you to take control of your learning and to be an independent and self-regulated learner?
b. How did the EDCI 568 course support or how did the EDCI 568 course not support your control and independence of learning?

2. Term and definition: Feeling of Competence refers to feeling confident in your capacities and abilities to work in an environment.
   a. Do you think the EDCI 568 course supported your feelings of competence when working on the course activities and assignments?
   b. How did the EDCI 568 course support or how did the EDCI 568 course not support your feeling of competence?
3. Term and definition: Feeling of relatedness refers to feelings of belonging to an environment and connected with others in the course.
   a. Do you feel that the EDCI 568 course supported your feeling relatedness (belonging and connected)?
   b. How did the EDCI 568 course or did not support your feeling of relatedness?
   c. Were there any activities that helped you to feel related to the instructor? To classmates? To the world around you?

Personalized Learning:

1. Term and definition: Personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Specifically, the learning experience is tailored to learning preferences and the specific interests of different learners.
   a. What do you think about the term "personalized learning"?
   b. What do you think about the term personalized learning in formal education?
   c. What do you think about the term personalized learning in online learning?

Experience with Personalized Learning Course: (Experimental Group only)

You already responded to 11 questions about your personalized learning in EDCI 568 course,

and here are several questions that will rely on these responses,

1. How did you learn what you needed from the 568 course?
2. You said this course did/did not help you to learn deeply, can you explain that further?
3. Can you think of the course activities or teaching strategies that supported your learning preferences (e.g., videos, readings, weekly discussions, individual project)?
4. What do you think about the feedback that was provided in this course?
5. Did you find that the course components were personalized to your learning needs?
6. How did the personalized learning options in this course meet/or not meet your learning choices and interests?

7. You mentioned that you liked/disliked the three pathways design, so can you explain why did you like/dislike this design?
8. How did the course content align with your personal goals?
9. Did this course help you to take control of your learning? How?
10. Did you meet your personal goals for learning during this course?

Do you have any suggestions to improve this personalized e-learning course?

APPENDIX C. SURVEYS

Pre-Control Questionnaire

1. What is your first name _____?
2. What is your last name _____?
3. What is your student ID number _____?
4. Who is your instructor?
   a. Dr. XXXXX
   b. Dr. XXXXX

Online Student Engagement

Please think about your engagement in past e-learning courses and answer the following questions:

The response is a five Likert-Scale

1. Making sure to study on a regular basis
2. Putting forth effort
3. Staying up on the readings
4. Looking over course notes between getting online to make sure I understand the material
5. Being organized
6. Taking good notes over readings, PowerPoints, or video lectures
7. Listening/reading carefully
8. Finding ways to make the course material relevant to my life
9. Applying the course material to my life
10. Finding ways to make the course interesting to me
11. Really desiring to learn the material
12. Having fun in online chats, discussions or via email with the instructor or other students
13. Participating actively in small-group discussion forums
14. Helping fellow students
15. Getting a good grade
16. Doing well on the projects
17. Engaging in conversations online (chat, discussions, email)
18. Posting in the discussion forum regularly
19. Getting to know other students in the class

Basic Psychological Need Satisfaction

Feelings I Have

Please read each of the following items carefully, thinking about how it relates to your experience with past e-learning courses, and then indicate how true it is for you. Use the following scale to respond:

1. I feel like I am free to decide for myself how to learn what I needed from the e-learning courses.
2. I really liked the students I interacted with in the e-learning courses.
3. Often, I did not feel very competent during the e-learning courses.
4. I felt pressured in the e-learning courses.
5. Students in the e-learning courses tell me I am good at what I do.
6. I got along with students I came into contact with in e-learning courses.
7. I pretty much keep to myself and didn't have a lot of social contacts in the e-learning courses.
8. I generally felt free to express my ideas and opinions e-learning courses.
9. I consider the students I regularly interact with to be my friends.
10. I had been able to learn interesting new skills in the e-learning courses.
11. In the e-learning courses, I frequently had to do what I was told.
12. Students in the e-learning courses cared about me.
13. Most days I felt a sense of accomplishment from what I did.
14. Students I interacted with in the e-learning courses tended to take my feelings into consideration.
15. In the e-learning courses, I did not get much of a chance to show how capable I am.
16. There were not many students that I was close to in the e-learning courses.
17. I felt like I can pretty much be myself in my e-learning courses.
18. The students I interacted with in the e-learning course regularly did not seem to like me much.
19. I often did not feel very capable.
20. There was not much opportunity for me to decide for myself how to do activities in the e-learning courses.
21. Students in the e-learning courses were generally pretty friendly towards me.

Demographics Items

1. What is your gender?
   - Male
   - Female
2. What is your age group?
   - 18-24 (1)
   - 25-35 (2)
   - 36-45 (3)
   - 46-55 (4)
   - 56 or older (5)

3. What is your graduate school level?
   - Ph.D. Level
   - Master Level
4. If you are working, what is the title of your current position?
5. What is the format of your program?
   - Face-to-face program
   - Online program
6. How many formal e-learning courses have you taken?
   - 1-3 (1)
   - 3-5 (2)
   - 5-7 (3)
   - 7-9 (4)
   - 9 or more (5)
7. How many LDT e-learning courses have you taken?
   - 1-3 (1)
   - 3-5 (2)
   - 5-7 (3)
   - 7-9 (4)
   - 9 or more (5)
8. How do you rate your PREVIOUS online learning experience?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor
9. How do you rate your educational technology proficiency?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

Instructional Strategies Items

10. What were the most impactful assignment/strategies to your learning?
    - Readings (1)
    - Online discussion (2)
    - Individual project (3)
    - Group Project (4)
    - Videos/media (5)
    - Video Tutorial (6)

Post-Control Survey

5. What is your first name _____?
6. What is your last name _____?
7. What is your student ID number _____?

8. Who is your instructor?
    a. Dr. XXXXX
    b. Dr. XXXXX

Online Student Engagement

Please think about your engagement in your EDCI 568 course and answer the following questions:

The response is a five Likert-Scale

1. Making sure to study on a regular basis
2. Putting forth effort
3. Staying up on the readings
4. Looking over class notes between getting online to make sure I understand the material
5. Being organized
6. Taking good notes over readings, PowerPoints, or video lectures
7. Listening/reading carefully
8. Finding ways to make the course material relevant to my life
9. Applying the course material to my life
10. Finding ways to make the course interesting to me
11. Really desiring to learn the material
12. Having fun in online chats, discussions or via email with the instructor or other students
13. Participating actively in small-group discussion forums
14. Helping fellow students
15. Getting a good grade
16. Doing well on the projects
17. Engaging in conversations online (chat, discussions, email)
18. Posting in the discussion forum regularly
19. Getting to know other students in the class

Basic Psychological Need Satisfaction

Feelings I Have

Please read each of the following items carefully, thinking about how it relates to your experience with your EDCI 568 course, and then indicate how true it is for you. Use the following scale to respond:

1. I feel like I am free to decide for myself how to learn what I needed from this e-learning course.
2. I really liked the students I interacted with in this e-learning course.
3. Often, I did not feel very competent during this e-learning course.
4. I felt pressured in this e-learning course.
5. Students in this e-learning course tell me I am good at what I do.

6. I got along with students I came into contact with in this e-learning course.
7. I pretty much keep to myself and didn't have a lot of social contacts in this e-learning course.
8. I generally felt free to express my ideas and opinions this e-learning course.
9. I consider the students I regularly interact with to be my friends in this e-learning course.
10. I had been able to learn interesting new skills in this e-learning course.
11. In this e-learning course, I frequently had to do what I was told.
12. Students in the course cared about me.
13. Most days I felt a sense of accomplishment from what I did.
14. Students I interacted with in this e-learning course tended to take my feelings into consideration.
15. In this e-learning course, I did not get much of a chance to show how capable I am.
16. There were not many students that I was close to in this e-learning course.
17. I felt like I can pretty much be myself in this e-learning course.
18. The students I interacted with in this e-learning course regularly did not seem to like me much.
19. I often did not feel very capable.
20. There was not much opportunity for me to decide for myself how to do activities in this e-learning course.
21. Students in this e-learning course were generally pretty friendly towards me.

Demographics Items

1. How many hours did you spend per week on preparing/doing assignment for your EDCI 568 course?
   - 0-2 hours (1)
   - 3-5 hours (2)
   - 6-7 hours (3)
   - 8-10 hours (4)
   - 10 or more hours (5)
2. How do you rate your CURRENT experience with this e-learning course?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor
3. How do you rate your educational technology proficiency?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

4. How do you rate the course instructor of this course?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

Instructional Strategies Items

5. What were the most impactful assignment/strategies to your learning?
- Readings (1)
- Online discussion (2)
- Individual project (3)
- Group Project (4)
- Videos/media (5)
- Video Tutorial (6)
6. **Are you willing to participate in an interview to discuss your experience further? If you are, please provide your email address and we will contact you within the next week.** _____

Pre-Experiment group Questionnaire

9. What is your first name _____
10. What is your last name _____
11. What is your student ID number _____
12. Who is your instructor?
    a. Dr. XXXXX
    b. Dr. XXXXX

Online Student Engagement

Please think about your engagement in past e-learning courses and answer the following questions:

The response is a five Likert-Scale

1. Making sure to study on a regular basis
2. Putting forth effort
3. Staying up on the readings
4. Looking over class notes between getting online to make sure I understand the material
5. Being organized
6. Taking good notes over readings, PowerPoints, or video lectures
7. Listening/reading carefully
8. Finding ways to make the course material relevant to my life
9. Applying the course material to my life
10. Finding ways to make the course interesting to me

11. Really desiring to learn the material
12. Having fun in online chats, discussions or via email with the instructor or other students
13. Participating actively in small-group discussion forums
14. Helping fellow students
15. Getting a good grade
16. Doing well on the projects
17. Engaging in conversations online (chat, discussions, email)
18. Posting in the discussion forum regularly
19. Getting to know other students in the class

Basic Psychological Need Satisfaction

Feelings I Have

Please read each of the following items carefully, thinking about how it relates to your experience with past e-learning course, and then indicate how true it is for you. Use the following scale to respond:

1. I feel like I am free to decide for myself how to learn what I needed from the e-learning courses.
2. I really liked the students I interacted with in the e-learning courses.
3. Often, I did not feel very competent during the e-learning courses.
4. I felt pressured in the e-learning courses.
5. Students in the e-learning courses tell me I am good at what I do.
6. I got along with students I came into contact with in e-learning courses.
7. I pretty much keep to myself and didn't have a lot of social contacts in the e-learning courses.
8. I generally felt free to express my ideas and opinions e-learning courses.
9. I consider the students I regularly interact with to be my friends.
10. I had been able to learn interesting new skills in the e-learning courses.
11. In the e-learning courses, I frequently had to do what I was told.
12. Students in the e-learning courses cared about me.
13. Most days I felt a sense of accomplishment from what I did.
14. Students I interacted with in the e-learning courses tended to take my feelings into consideration.
15. In the e-learning courses, I did not get much of a chance to show how capable I am.
16. There were not many students that I was close to in the e-learning courses.
17. I felt like I can pretty much be myself in my e-learning courses.
18. The students I interacted with in the e-learning course regularly did not seem to like me much.
19. I often did not feel very capable.
20. There was not much opportunity for me to decide for myself how to do activities in the e-learning courses.
21. Students in the e-learning courses were generally pretty friendly towards me.

Demographics Items

1. What is your gender?
   - Male
   - Female
2. What is your age group?
   - 18-24
   - 25-35
   - 36-45
   - 46-55
   - 56 or older
3. What is your graduate school level?
   - Ph.D. Level
   - Master Level
4. If you are working, what is the title of your current position?
5. What is the format of your program?
   - Face-to-face program
   - Online program
6. How many formal e-learning courses have you taken?
   - 1-3
   - 3-5
   - 5-7
   - 7-9
   - 9 or more
7. How many LDT e-learning courses have you taken?
   - 1-3
   - 3-5
   - 5-7
   - 7-9
   - 9 or more
8. How do you rate your PREVIOUS online learning experience?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor
9. How do you rate your educational technology proficiency?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

Instructional Strategies Items

10. What were the most impactful assignment/strategies to your learning?
    - Readings
    - Online discussion
    - Individual project
    - Group Project
    - Videos/media
    - Video Tutorial
11. Please rank the most impactful assignments/strategies for your learning in EDCI 568 based on the options below?
    - Readings
    - Online discussion
    - Individual project
    - Group Project
    - Videos/media
    - Video Tutorial
12. Are you willing to participate in an interview to discuss your experience further? If you are, please provide your email address and we will contact you with in the next week. _____

Post-Experimental Questionnaire

13. What is your first name _____?
14. What is your last name _____?
15. What is your student ID number _____?
16. Who is your instructor?
    a. Dr. XXXXX
    b. Dr. XXXXX

Personalized Learning Items

Personalized e-learning rate items: Five Likert-Scale

Please think about your experiences in your EDCI 568 course and answer the following

questions:

1. This course was personalized to my learning needs.
2. I liked the "three learning pathways" design.
3. The course content supported my learning choices.
4. The course used instructional strategies to facilitate my learning preferences.
5. The course content supported my learning interests in the subject.
6. The course contents were aligned with my personal learning goals.
7. I received personalized rapid cycle feedback.
8. The course helped me to progress toward deeper learning.
9. I was an independent learner in this course.
10. The weekly discussions helped me to reflect on my learning.

11. I met my personal learning goals during this course.

Online Student Engagement

Please think about your engagement in your EDCI 568 course and answer the following

questions:

The response is a five Likert-Scale

20. Making sure to study on a regular basis
21. Putting forth effort
22. Staying up on the readings
23. Looking over class notes between getting online to make sure I understand the material
24. Being organized
25. Taking good notes over readings, PowerPoints, or video lectures
26. Listening/reading carefully
27. Finding ways to make the course material relevant to my life
28. Applying the course material to my life
29. Finding ways to make the course interesting to me
30. Really desiring to learn the material
31. Having fun in online chats, discussions or via email with the instructor or other students
32. Participating actively in small-group discussion forums
33. Helping fellow students
34. Getting a good grade
35. Doing well on the projects
36. Engaging in conversations online (chat, discussions, email)
37. Posting in the discussion forum regularly
38. Getting to know other students in the class

Basic Psychological Need Satisfaction

Feelings I Have

Please read each of the following items carefully, thinking about how it relates to your

experience with your EDCI 568 course, and then indicate how true it is for you. Use the

following scale to respond:

1. I feel like I am free to decide for myself how to learn what I needed from this course.
2. I really liked the students I interacted with in this course.
3. Often, I did not feel very competent during this course.
4. I felt pressured in this course.
5. Students in this course tell me I am good at what I do.
6. I got along with students I came into contact with in this course.
7. I pretty much keep to myself and didn't have a lot of social contacts in this course.
8. I generally felt free to express my ideas and opinions in this course.
9. I consider the students I regularly interact with to be my friends in this course.

10. I had been able to learn interesting new skills in this course.
11. In this course, I frequently had to do what I was told.
12. Students in this course cared about me.
13. Most days I felt a sense of accomplishment from what I did.
14. Students I interacted with in the course tended to take my feelings into consideration.
15. In this course, I did not get much of a chance to show how capable I am.
16. There were not many students that I was close to in this course.
17. I felt like I can pretty much be myself in this course.
18. The students I interacted with in this course regularly did not seem to like me much.
19. I often did not feel very capable.
20. There was not much opportunity for me to decide for myself how to do activities in this course.
21. Students in this course were generally pretty friendly towards me.

Demographics Items

1. How many hours did you spend per week on preparing/doing assignment for this course?
   - 0-2 hours
   - 3-5 hours
   - 6-7 hours
   - 8-10 hours
   - 10 or more hours
2. How do you rate your CURRENT experience with this online course?
- Excellent
   - Very good
   - Good
   - Fair
   - Poor
3. How do you rate your educational technology proficiency?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor
4. How do you rate the course instructor of this course?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

Instructional Strategies Items

5. What were the most impactful assignment/strategies to your learning?
   - Readings
   - Online discussion
   - Individual project
   - Group Project
   - Videos/media
   - Video Tutorial

6. Please rank the most impactful assignments/strategies for your <u>online</u> learning based on the options below?
   - Readings
   - Online discussion
   - Individual project
   - Group Project
   - Videos/media
   - Video Tutorial

7. The overall quality of the of this course was:
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

8. Do you have any comments that may improve personalized learning opportunities and practices in this course?

VITA

Hamdan Alamri obtained his B.A. in Arabic Language and Literature from Taif University back in 2009. He received his M.Ed. in Instructional Media and Technology from Eastern Washington University in 2013. In 2019, Hamdan completed his Ph.D. in Learning Design and Technology from Purdue University, West Lafayette, Indiana. Hamdan also completed several teaching, technology, and research certifications during his time in both, Eastern Washington University and Purdue University. Hamdan had served as instructor and instructional designer at King Saud University, Riyadh, Saudi Arabia.

Hamdan studies personalization in higher education. He investigates personalized learning as an instructional approach in online higher education. To understand the functionality and effectiveness of this approach, Hamdan investigates students' engagement, motivation, self-efficacy, and self-directed learning when given personalized learning interventions. Hamdan has several writing projects including book chapters and journal articles that discuss the implementation of personalized learning in higher education and online learning.