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# Using personalized learning as an instructional approach to motivate learners in online higher education: Learner self-determination and intrinsic motivation

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## ABSTRACT

In this qualitative comparison study, we examine the perceived efficacy of using personalized learning (PL) activities based on PL principles to support students' psychological need satisfaction and intrinsic motivation in an online course using a traditional one-size-fits-all model. We apply self-determination theory as a framework to investigate students' perceptions of their psychological need satisfaction (e.g., competence, autonomy, and relatedness) and relation to students' intrinsic motivation when enrolled in an online course implementing PL principles. Overall, the study results showed the potential of implementing personalized learning principles in online courses to support students' psychological need satisfaction (e.g., autonomy and competence) and intrinsic motivation. Furthermore, students perceived the PL interventions as engaging and effective in meeting their learning needs and interests.

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## KEYWORDS

Higher education; intrinsic motivation; online learning; perceived learning; personalized learning; motivation; self-determination theory

Over the last century, the instructional approaches encouraged in formal learning contexts have changed from teacher-centered to learner-centered paradigms (Barr & Tagg, 1995; Cuban, 1993; Demski, 2012; Rickabaugh, 2012). This paradigm shift to learner-centered instruction in higher education requires instructor's roles to also change into learning designers and facilitators rather than controllers of the learning process (Barr & Tagg, 1995). Despite the benefits of learner-centered instruction, higher education instructors often still use a one-size-fits-all model for their instructional practices (Demski, 2012), which is more consistent with meeting instructor needs rather than student needs. In this model, instructors use a standardized curriculum for all students, and student learning progresses in a time-based curriculum with set due dates rather than through a process of skills mastery and knowledge acquisition (Demski, 2012).

Online courses are often developed and taught using this one-size-fits-all model to provide a standardized curriculum, a model that does not meet many learners' needs and interests (Demski, 2012). Personalized learning (PL) is a learner-centered instructional approach (McCombs, 2008, 2013) that can be implemented to provide instructional content focused on addressing learner needs and interests (Watson & Watson, 2017). PL principles, including personalized instructional goals, personalized instruction focused on learners' interests, personal learning choices, learner control, and personalized assessment and evaluation (see Table 1), can be implemented in an online course to provide customized learning curricula that addresses individuals' learning needs and interests (Ainley, Hidi, & Berndorff, 2002; Bray & McClaskey, 2016; Sota, 2016; Watson &

**Table 1.** Alignment of personalized learning principles, instructional design decisions, and students’ perceptions toward the targeted SDT components and learning outcomes.

Principles	Instructional Design Decisions ( <i>Redesigned Course</i> )	Targeted SDT Contextual Support (PL Course)	Students’ Perceptions of Their SDT Contextual Support (PL Course)	Perceptions of Learning Outcomes (PL Course)	Perceptions of Learning Outcomes (One-Size-Fits-All Course)
<b>Personalized Instructional Goals</b>	– Goal setting (ZPD) (Vygotsky, 1978; Watson & Watson, 2017)	– Autonomy – Competence	– Positive	– Positive perception toward meeting personal goals	– Did not emerge in this course condition
<b>Personalized Instruction</b>	– Learning pathways/tracks (Watson & Watson, 2017) – PL assignments-task selection (Watson & Watson, 2017) – Course project-project design (Watson & Watson, 2017) – Instructor support throughout the course (Watson & Watson, 2017) – Instructors’ facilitation (Watson & Watson, 2017)	– Autonomy – Competence  – Intrinsic motivation	– Positive – Positive  – Positive	– Positive perception toward personalized instruction	– Negative Perceptions toward one-size-fits-all course design
<b>Learner Needs and Interests</b>	– PL course design (Barr & Tagg, 1995; Bernacki & Walkington, 2018; Watson & Watson, 2017) – Inclusion of all possible pathways/tracks within the course objectives and parameters (Barr & Tagg, 1995; Bernacki & Walkington, 2018; Watson & Watson, 2017) – Instructors’ facilitation of PL course (Bernacki & Walkington, 2018; Watson & Watson, 2017) – Personalized readings (Watson & Watson, 2017)	– Autonomy – Competence  – Intrinsic motivation	– Positive  – Positive  – Positive	– Positive perceptions toward meeting learning needs and interests	– Negative Perceptions toward one-size-fits-all course design
<b>Learner Choices</b>	– Learners given the chance to select among learning topics, activities, and instructional methods (Bray & McClaskey, 2016; Patall et al., 2010; Watson & Watson, 2017) – Personalized readings (Watson & Watson, 2017) – Curriculum relevance (Assor et al., 2002; Demski, 2012; Lee et al., 2015; Patall et al., 2010; Ryan & Deci, 2000)	– Autonomy – Competence  – Intrinsic Motivation	– Positive  – Positive  – Positive	– Positive perceptions toward meeting learning choices	– Students did not receive learning choices in this course condition.

(continued)

Table 1. Continued.

Principles	Instructional Design Decisions ( <i>Redesigned Course</i> )	Targeted SDT Contextual Support (PL Course)	Students' Perceptions of Their SDT Contextual Support (PL Course)	Perceptions of Learning Outcomes (PL Course)	Perceptions of Learning Outcomes (One-Size-Fits-All Course)
<b>Learning Control and Independence (Learning Self-Drive)</b>	<ul style="list-style-type: none"> <li>– PL course design (Barr &amp; Tagg, 1995; Bray &amp; McClaskey, 2016; Demski, 2012; Watson &amp; Watson, 2017)</li> <li>– Learners decide their learning pathways, activities, and tasks (Barr &amp; Tagg, 1995; Bray &amp; McClaskey, 2016; Demski, 2012; Watson &amp; Watson, 2017)</li> </ul>	<ul style="list-style-type: none"> <li>– Autonomy</li> <li>– Competence</li> </ul>	<ul style="list-style-type: none"> <li>– Positive</li> <li>– Positive</li> </ul>	<ul style="list-style-type: none"> <li>– Positive perceptions toward learning control and learning self-drive</li> </ul>	<ul style="list-style-type: none"> <li>– Positive perceptions toward learning control and learning self-drive</li> </ul>
<b>PL in Online Learning</b>	<ul style="list-style-type: none"> <li>– Relevant curriculum, interaction with instructors, interaction between students, personalized online discussion boards, and PL as instructional approach in online learning environment (Sural &amp; Yazici, 2018; Watson &amp; Watson, 2017)</li> </ul>	<ul style="list-style-type: none"> <li>– Relatedness</li> <li>– Intrinsic motivation</li> </ul>	<ul style="list-style-type: none"> <li>– Negative</li> <li>– Positive</li> </ul>	<ul style="list-style-type: none"> <li>– Positive perceptions toward relevant curriculum</li> </ul>	<ul style="list-style-type: none"> <li>– Positive perceptions toward relevant curriculum (with support from instructors)</li> </ul>
<b>PL Assessment and Evaluation</b>	<ul style="list-style-type: none"> <li>– Individualized and differentiated feedback, proposed personalized assignment plan, reflection based on the identified learning goals, and peer feedback based on the learning pathways (Watson &amp; Watson, 2017)</li> </ul>	<ul style="list-style-type: none"> <li>– Autonomy</li> <li>– Competence</li> <li>– Relatedness</li> </ul>	<ul style="list-style-type: none"> <li>– Positive</li> <li>– Positive</li> <li>– Negative</li> </ul>	<ul style="list-style-type: none"> <li>Positive perceptions toward PL assessment and evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Positive perceptions toward PL assessment and evaluation</li> </ul>

Watson, 2017). This supports learners' psychological need satisfaction (autonomy, competence, and relatedness), leading to higher levels of intrinsic motivation and greater academic engagement (Niemic & Ryan, 2009). Therefore, for instructors teaching online courses, PL may provide learners with a learning experience that better meets individuals' learning backgrounds, needs, and interests, and it improves learner satisfaction (Demski, 2012; New Media Consortium, 2016; Rickabaugh, 2012; U.S. Department of Education, 2010; Watson & Watson, 2017; Watson, Watson, & Reigeluth, 2012).

Over the last few decades, researchers have focused on customizing instruction to provide PL experiences (Demski, 2012; New Media Consortium, 2016). Despite this, little research has investigated the impact of PL interventions on learners' autonomy, competence, relatedness, and intrinsic motivation (Garrick, Pendergast, & Geelan, 2017; Wolper, 2016). In particular, there has been limited investigation of interventions using customized instructional content in online courses. Therefore, the purpose of this study was to explore the potential of implementing PL principles in online learning design, development, and implementation to provide better learning experiences that are motivating and engaging for online graduate students. In this study, we investigated the design, development, and implementation of an online course using PL principles as an intervention to increase students' psychological need satisfaction (e.g., autonomy,

competence, and relatedness) that might result in an increase in self-determination and intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). In this study, we applied self-determination theory (SDT) as the framework to investigate students' perceptions of their psychological need satisfaction (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) when enrolled in an online course designed using personalized learning principles and SDT strategies. We also focused on investigating how students' learning experiences differed between a one-size-fits-all online course and an online course created with a personalized learning approach.

## Research questions

1. How do students perceive their psychological need satisfaction (e.g., autonomy, competence, and relatedness) and intrinsic motivation in a personalized e-learning course compared to a one-size-fits-all e-learning course?
2. How do students' learning experiences differ between a one-size-fits-all online course and an online course with a personalized learning approach?

## Review of literature

### *Personalized learning*

The concept of personalized learning is built on established learning theories such as Bruner's constructivism for supporting autonomous, active, and independent learners; Vygotsky's focus on social interaction, contextualization, and the zone of proximal development; and SDT (Deci, Ryan, & Williams, 1996), which emphasizes the impact of goal setting on learners' achievements and intrinsic and extrinsic motivation (Watson & Watson, 2017). Personalized learning adheres to the learner-centered paradigm to create learning that centers on the learner instead of the instructor. Redding (2014) stated that personalized learning replaces the traditional educational one-size-fits-all 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 drives instructors toward a model that frees learners from those constraints, allowing them to progress at their own pace. For this study, we adopted the Department of Education Office of Educational Technology's (2016) personalized learning definition, which states the following:

Personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) all may vary based on learner needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated. (p. 7)

Based on this definition, we define 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 psychological need satisfaction and intrinsic motivation.

Personalized learning has recently been trending in higher education. Administrators in some universities and colleges have realized that personalized learning can enhance students' learning and increase retention (Foss, Foss, Paynton, & Hahn, 2014). Designing online courses in higher education while applying personalized learning principle consideration supports and enhances students' basic needs, which affects their intrinsic motivation and thereby influences their learning (Deci & Ryan, 1985, 2000). In this study, we implemented PL principles, including personalized instructional goals, personalized instruction focusing on learners' interests, personal learning choices, learner control, and personalized assessment and evaluation (see [Table 1](#)) in a graduate-

level online course to improve students' learning experiences by tailoring the learning materials and content to their needs and interests.

### **Self-determination theory**

SDT provides an 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 the skills, knowledge, and beliefs that enable a person to engage in goal-directed, self-regulated, autonomous behavior, arguing that an understanding of one's strengths and limitations together with a belief in oneself as capable and effective are essential to self-determination. The theory defines three psychological needs: (a) *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); (b) *autonomy* refers to “being self-initiating and self-regulating of one's own actions” (Deci, Vallerand, Pelletier, & Ryan, 1991, p. 327); and (c) *relatedness* refers to “developing secure and satisfying connections with others in one's social milieu” (p. 327).

Online educators can use SDT strategies to design activities that support autonomy, competence, and relatedness. Reeve (2002) indicated that learning experiences that provide choices to foster learning interests can support autonomy while controlled learning environments that provide external rewards can decrease learners' perceived autonomy. According to SDT, learning environments that support learning choices and interests (e.g., personalized learning environment) are more likely to support perceived autonomy and competence (Garn & Jolly, 2014; Patall, Cooper, & Wynn, 2010).

Assor, Kaplan, and Roth (2002) found providing relevant curriculum to be a factor that supports feelings of autonomy. Prior researchers have also suggested that fostering relevance in the learning environment might be a supportive practice that enhances autonomy, resulting in supporting learners' goals, interests, and values (Assor et al., 2002; Ryan & Deci, 2000). Students become autonomous when they feel their individual interests have been taken into consideration (Reeve & Jang, 2006) and have been provided with academic activities that are relevant to their academic and professional interests (Lee, Pate, & Cozart, 2015). Learners must see a meaningful connection between the learning objectives and their learning and professional development (Lee et al., 2015), and, specifically, online learners need to see the connection to avoid dropping the course. Thus, personalizing an online course through designing a relevant curriculum focused on students' needs and interests can result in more autonomous learners. Research has revealed that when learners see the connection between the course content and assignments, it is more likely that the learners will spend more time and effort, resulting in a higher potential to complete the course assignments (Lee et al., 2015; Patall et al., 2010).

SDT emphasizes that educators should help students feel competent by providing optimal challenge activities and performance feedback. Deci et al. (1991) indicated that perceived competence is linked to intrinsic motivation. Garn and Jolly (2014) stated that “feelings of competence are promoted when learning environments differentiate tasks at the appropriate level of challenge for high ability students” (p. 11). Giving students meaningful learning choices has proven to be a supportive strategy for promoting feelings of competence (Garn & Jolly, 2014).

According to SDT, supporting perceived feeling of relatedness facilitates intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). Effective interaction and communication among instructors and students can support students' feelings of relatedness to their environment (Garn & Jolly, 2014). SDT emphasizes that, when a learning environment enhances learning interests, students will likely feel supported in terms of their relatedness and competence (Garn & Jolly, 2014).

### ***Intrinsic motivation***

Individuals 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. Deci (1975) proposed that intrinsic motivation refers to 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) also argued that extrinsic rewards can shift motivation from internal to external and undermine individuals’ feelings of motivation, resulting in their feeling controlled.

### ***Personalized course design and SDT recommendations***

Studies have shown the importance of students’ motivation in online learning environments (Lim & Kim, 2002; Park & Choi, 2009; Yukselturk & Bulut, 2007). Chen and Jang (2010) identified how to mediate the effect of online learners’ need satisfaction between “contextual support and motivation/self-determination” (p. 741) and suggested providing online learners with a learner-centered environment, flexible learning options, and a choice in learning strategies, emphasizing that online instructors need to provide customized facilitation to individuals to reduce uncertainty to promote motivated and self-determined online learners.

We therefore relied, for the PL course design, on the SDT theoretical recommendations to provide contextual support to enhance online learners’ feelings of autonomy by providing relevant curriculum (Assor et al., 2002), a learner-centered environment that allows choices to foster learning interests (Chen & Jang, 2010; Deci & Ryan, 2000; Garn & Jolly, 2014; Patall et al., 2010; Reeve, 2002; Ryan & Deci, 2000), and opportunities for personalization (Patall et al., 2010). Feelings of competence were supported through meaningful learning choices, differentiated tasks, and choice in different learning strategies (Deci & Ryan, 2000; Garn & Jolly, 2014; Reeve, 2002; Ryan & Deci, 2000). We also implemented several strategies to promote feelings of relatedness, including instructors’ interacting and communicating with online learners to support their individual needs, personalized peer-feedback to support interaction and communication between students based on their learning interests, and designing personalized discussion boards in the learning management system to group students based on their learning pathways (Chen & Jang, 2010; Deci & Ryan, 2000; Garn & Jolly, 2014; Reeve, 2002; Ryan & Deci, 2000; see Table 1).

## **Methods**

We used a qualitative research design to examine students’ perceptions of their experiences within a *one-size-fits-all course* in comparison with a *personalized online course*. We gathered data using an in-depth interview protocol and course reflections. Because the purpose of the study was to investigate the courses’ influence on graduate students’ psychological need satisfaction and intrinsic motivation, we used thematic analysis to analyze the interviews and compare the extracted themes from the two courses (i.e., one-size-fits-all course and personalized e-learning course; Boyatzis, 1998; Braun & Clarke, 2006). The aim of the comparison between themes was to understand how students perceived their learning experiences with the personalized learning approach compared to those in the one-size-fits-all course (Creswell, 2013).

### ***General learning context***

The research occurred in an online course (Partnering with Web-based Tools for Learner-Centered Environments) in a Learning Design and Technology online graduate program at a

large, Midwestern university in the United States. The program welcomes professionals from around the world, who come with their own experiences, needs, and interests. Course sections typically have 15–20 students enrolled, with one to two course sections offered in the fall and also in the spring semester. Courses are taught by full-time faculty or adjuncts, and their career experience may not align with that of the students.

Although the program attracts students from different professional areas, learning and career interests can generally be categorized into four main categories: higher education, K–12 education, corporate training, and consultancy. Despite the varied student career interests, we found from the student feedback that the course content and instructional practices hindered students' learning, engagement, and enjoyment of the course. Many students reported that the course content was overly focused on K–12 instruction and that opportunities to learn based on personal learning interests and career needs were not being met. The course materials, including readings and videos, and the course activities such as discussions and assignments, were focused on K–12 education. Students who had little experience or interest in working as an instructional designer in the K–12 area found the materials and the instructional methods uninteresting, and they were not aligning with their learning needs. Therefore, the course underwent a redesign to include opportunities for students to personalize their learning throughout their learning experience.

### ***Personalized course design***

The online course used in this study was initially designed using a one-size-fits-all model. Based on students' feedback on course evaluations, we conducted student interviews and surveys and examined course reflections to understand students' learning needs and interests in this course. We asked questions to explore students' interests and needs (e.g., (1) "Thinking back to your learning 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 how you learned and what you learned aligns with your goals?" and (2) "Were there instructional content and/or experiences you feel prevented you or were barriers in learning things you found to be personally relevant?").

We also served as the instructional designers and found that enrolled students' main areas of foci were K–12, higher education, corporate training, and consultancy. Therefore, we utilized personalized learning principles to redesign the course and provide learning content, assignments, activities, and assessments based on these four areas of interest. The options that are presented to learners include instructional strategies and materials that align the learning with learner's personal needs and interests. Although learners have many options, including defining their learning choices, preferences, and interests, the instructors still control deadlines and some decisions (i.e., assessment and evaluation) to ensure that learning meets the course parameters. We also provided flexibility for students whose career interests may branch across these four areas, such as those interested in instructional design consulting. The course content that was provided was aligned with the four areas of interest (learning pathways), including textbooks, case studies, articles, instructional videos, and external links, as well as a variety of learning resources. Therefore, students in each of the learning pathways had different textbooks, readings, videos, and other course content. In addition, students could substitute or add additional different learning content and resources as the learning resources for their studies.

### ***Learning pathways***

We created four different pathways encompassing the students' learning needs, interests, and preferences and gave students the option of selecting their learning pathway to which they would use as they progressed in the course.



**PL assignments**

We designed the course assignments to create flexibility, giving students the opportunity to design their assignments based on their area of interest, including the selection of the topic, context, assignment components, and associated learning content. In addition, students had the option to propose the assessments of their learning through creating a proposal for their major course assignments. This “Proposed Personalized Assignment Plan” option provided students with a template they could use when creating their plan for their major assignments for the course.

**Online discussion boards**

We revised the discussion forums and discussion threads to provide opportunities for discussing topics within the different pathways and across the pathways and provide opportunities for students to receive feedback from others with similar learning pathway interests. We created some discussion forums and threads for students from all pathways and designed others for specific learning pathways; students joined and interacted in the forum according to their learning pathway.

**Assessment and feedback**

Instructors provided personalized assessment and feedback for every learner and allowed learners to tweak the course content, due dates, assignments, and projects.

**Reflection**

We asked students to reflect at the beginning of the course and at the end of the course on their learning goals and interests. In addition, at the end of the course, we asked students to consider whether the course design and format had helped them meet their learning goals and interests (see Table 1 and Figure 1).

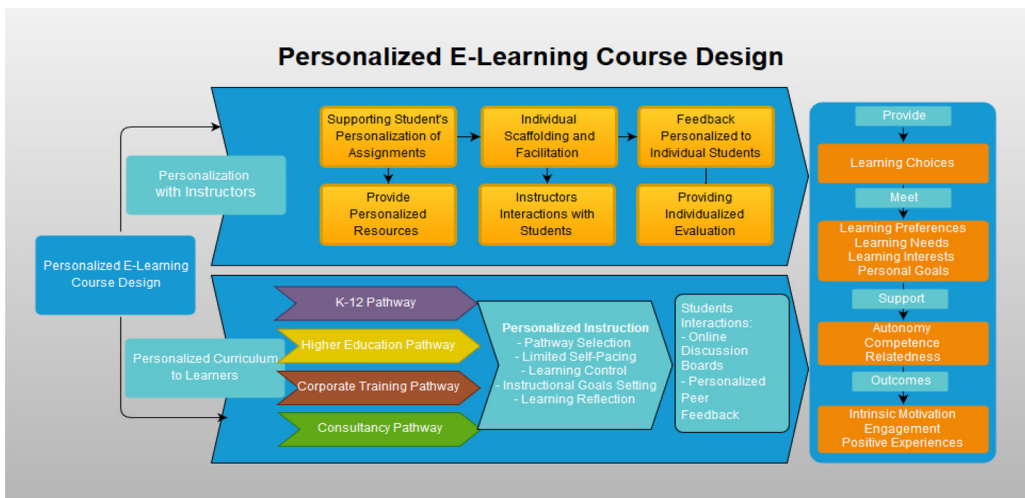


Figure 1. The personalized e-learning course model used in designing the course.

**Data collection**

We conducted data collection during the 2018/2019 academic year. During the final week of the course, we invited students to participate in interviews to obtain their perceptions of their psychological need satisfaction and intrinsic motivation during their enrollment in the one-size-fits-

all course and the personalized course. All enrolled students had the chance to participate and share their experiences. We used a semi-structured interview protocol to interview the participants, including SDT, and personalized learning terms and definitions to ensure the participants understand the protocol content. During the interview, we introduced the participants to the research topic, objectives, terms, and definitions. In particular, we asked all participants about their definition of personalized learning and its possibility to be implemented in formal education (see Table 2). We conducted the interviews via multiple methods, including phone or WebEx. We audiotaped and transcribed the interviews verbatim. Each interview lasted approximately 20–40 min. In addition, students reflected on their learning during the course and how the course (one-size-fits-all course or the personalized e-learning course format) assisted them to learn and meet their personal learning goals.

**Table 2.** 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."
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."
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."

### **Course setting and participants**

In this study, we utilized an online course to implement personalized learning as an instructional approach. Two instructors taught the original one-size-fits-all course, and, after we redesigned the course using personalized learning principles and offering students four pathways to choose from, providing an opportunity of choice of more personalized content and assignments, the same instructors taught the one-size-fits-all course as a personalized learning course.

The study participants included graduate students enrolled in six sections of the online graduate-level course offered during the spring and fall semester. The study included four participants from the one-size-fits-all course and four participants from the personalized course to compare students' perceptions regarding their perceived learning, psychological need satisfaction, intrinsic

**Table 3.** Interview participants’ demographics.

Pseudonym	Instructional Approach	Learning Pathways	Current Job	Future Job
Sara	One-Size-Fits-All Course	Corporate Training	Corporate Trainer	Instructional Designer in Global Corporate
Katherine	One-Size-Fits-All Course	Corporate Training	Technology Trainer	Technology Trainer
Emily	One-Size-Fits-All Course	Higher Education	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	English as Second Language Instructor	English as Second Language Instructor
Amelia	Personalized Course	Higher Education	Instructional Designer	Instructional Designer
Maya	Personalized Course	Corporate Training Pathway	Trainer/Instructional Designer in the Corporate World	Instructional Designer for a Consulting Firm
David	Personalized Course	Corporate Training Pathway	Learning and Development Specialist	Instructional Designer and Instructor in the Industry

motivation, and online learning experiences and engagement. We interviewed all participants from the one-size-fits-all course who agreed to participate in this study and selected interviewees from the PL course based on their learning pathways to include at least one interviewee from every pathway in the course. We informed the participants that their participation was voluntary and would not affect their course grades. Demographic information for participants that participated in interviews can be viewed in Table 3.

Table 2 represents interviewees’ perceptions of personalized learning definitions and applications in formal education. We asked all participants from both courses to share their own definitions and understanding of the personalized learning in formal education and online learning environment.

**Data analysis**

We audiotaped and transcribed the interviews to prepare for coding and the categorizing process, and we applied the thematic analysis approach to identify the themes from the interviews and course reflections (Boyatzis, 1998; Braun & Clarke, 2006). We followed Saldana’s (2016) three coding cycles. First, we conducted the first cycle of coding using multiple readings of interviews and sentence-level coding. In this cycle, we used deductive coding to identify the themes that bear relation to the specific questions asked to the interviewees (Braun & Clarke, 2006). For example, we asked students to identify the factors that supported their feeling of autonomy then we coded these factors accordingly and grouped them under the *feeling of autonomy* theme. We conducted the second cycle of coding inductively to extract emerging themes that represent students’ perceptions of their learning and experiences in the one-size-fits-all course and personalized course. For example, the *Students Unsatisfied with the Course Content and Course Approach* theme emerged from the one-size-fits-all course interviews and course reflections. We coded the third cycle to finalize the codes and themes for each research question (Saldana, 2016). During the coding procedures, we documented, analyzed, and discussed the themes with examples until we achieved consensus and established consistency. In addition, we included quotes from participant interviews to support the validity and dependability of the findings. Following this, we compared the themes between the two courses. For example, we coded the factors that supported students’ *feeling of autonomy* and compared them across the two courses to examine whether personalized learning contributed to supporting this type of feeling during the course.

Two major themes were the focus of the research in this study: psychological need satisfaction and perceived learning. We applied the three SDT perspectives—feelings of autonomy, competence, and relatedness (Deci & Ryan, 2000)—as the framework and the subthemes to investigate

the factors that supported students' psychological need satisfaction and intrinsic motivation in both instructional approaches: the one-size-fits-all course and the personalized course (see Table 4). The second major theme for this research study is perceived learning to investigate how students perceived the personalized learning approach in an online course compared with students' perceptions of the one-size-fits-all approach.

Within the major themes, we then compared and contrasted the subthemes (e.g., personal choices) and factors (e.g., course project, personalized learning approach, personalized readings) between the two courses to reveal the effect of personalized learning as an instructional approach in online learning courses (see Table 4). The purpose of this comparison was to determine (a) the factors that affected students' feelings of psychological need satisfaction and intrinsic motivation and (b) whether personalized learning contributed to supporting those variables within online learning courses.

### **Validation and reliability**

In this study, we followed multiple procedures to achieve internal validity (Onwuegbuzie & Leech, 2007; Polit & Beck, 2010). The procedures included data triangulation (interviews and course reflections analysis). Three volunteer experts (professors and instructional designers) participated in the review process of the interview protocol, which then was piloted with three participants to record time and any issues that could affect the actual interviews. We also conducted member-checking procedures by sharing the results with the participants to ensure credibility of the results.

We applied a semi-structured interview protocol (Appendix A), and one researcher conducted all eight interviews to ensure consistency of the data and findings. For the dependability of the study, we transcribed the interviews verbatim and included the positive and negative findings or concepts regarding students' perceptions from both the personalized course and one-size-fits-all course.

## **Results**

R1 – How do students perceive their psychological need satisfaction (autonomy, competence, and relatedness) and intrinsic motivation in a personalized e-learning course compared to a one-size-fits-all e-learning course?

### **Self-determination: Feeling of autonomy**

We asked participants from both courses (i.e., one-size-fits-all and personalized course) during the interviews to report the factors that supported their feeling of autonomy during their course experience. Students perceived the *course project* as helpful to facilitate their feeling of autonomy in both courses. However, the participants from the one-size-fits-all course indicated that *effective facilitation from their instructors* was the primary reason for their feeling of autonomy when completing the *course project assignment*. Participants from the personalized course indicated that the *course project* and the *personalized course design (learning pathways)* were the primary factors that facilitated the feeling of autonomy (see Table 4).

### **Perceptions regarding the course project**

The course project allowed students to create a training or course lesson with which they were interested. We asked students 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. The majority of the participants from both courses perceived the design of the course project as a factor that promoted their feeling of autonomy. The majority of participants (in both courses) thought that the project was set up to select whatever they were interested in, with a flexibility to adapt the focus of the project toward their learning needs.

**Project design.** We designed the course project as three sequential assignments to allow students to progress throughout the course time with instructors' feedback. The interviewees perceived the course project design as a key factor in supporting students' feeling of autonomy due to the design flexibility and ability to select the topics 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 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's support.** Instructors supported students individually and provided instruction that helped students feel confident and personalize the course focus toward their needs. Therefore, participants reported that they felt autonomous when instructors were flexible and supportive with regard to the course project. Sara, who was in the traditional course, 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**

Participants from the personalized course perceived the course design as a contributor to their feeling of autonomy. Although the factor that supported students' feeling of autonomy in the one-size-fits-all course was the project, the larger PL course design as a whole was perceived to promote autonomy (see Table 4). Participants from the personalized course reported ease with aligning the course project to their learning needs and found the course content and the pathways supported their learning and helped to 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 [sic], 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... . The pathway specifically helped me determine and align course content with initiatives that I needed to accomplish at my job too.

### **Self-determination: Feeling of competence**

We asked interviewees from both courses whether the course supported their feeling of competence and investigated the specific course factors that supported their feeling of competence. Amelia, an interviewee from the personalized course, described how the course both challenged her and increased her confidence:

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 [sic] 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.

Participants from the one-size-fits-all courses mentioned they felt competent when completing the *course project*. In comparison, interviewees from the personalized course perceived the *flexible learning pathways design* as the factor that supported their feeling of competence (see Table 4).

### **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 also supported their feeling of competence. Participants mentioned that the course project assisted them to progress consistently throughout the course and increase their confidence in designing instruction. 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.” These participants indicated that the course project assignment was authentic, relevant, and flexible in both types of courses.

### **Personalized course design**

Interviewees from the personalized course explicitly stated that the personalized course design (including the learning pathways) supported their feeling of competence during the course (see Tables 1 and 4). The interviewees 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 a 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 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 of 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.”

### **Self-determination: Feeling of relatedness**

We asked interviewees from both courses to reveal the factors that helped with their feeling of relatedness. In this study, the level of relatedness varied among students from both courses. Although some interviewees reported they felt related during the course, others did not feel connected or that they belonged. The majority of participants from both courses perceived the lack of relatedness and connection with others within the course (see Table 4). Interviewees who felt relatedness in these courses and connected socially thought that *interaction with their instructors* played an important role in their feelings of relatedness within the course. Therefore, these findings did not indicate whether personalizing the course (e.g., personalized discussion board and personalized peer feedback) supported the students' feeling of relatedness. However, the theme, *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 indicated they felt related to the instructors. Interaction and communication with the instructors played an important role in regard to feeling related within the course. 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 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; they felt connected with their instructors, which supported their feeling of relatedness in this course. 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***

However, differing from the sense of relatedness with the course instructor, interviewees from both courses indicated they felt a lack of interaction with other students.

***One-size-fits-all course.*** Participants from the one-size-fits-all course indicated that the course did not provide a 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.” When Emily was asked about her feelings of relatedness she said, “Yeah, if it was for the instructor I did feel very connected to, very relatable... to the other students, I would say no.”

***Personalized course participants.*** Participants from the personalized course felt the pathways were helpful in their learning, but, unfortunately, due to the design of the course pathways, students noted they led to a decrease of interactions with other students in different pathways, which created a feeling of 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 one another. Both Emma and Amelia indicated that although they enjoyed the personalized pathway design, they were the only learners in each pathway. Amelia mentioned,

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.

Course reflections analysis also showed that the learning pathways did not support students’ interactions and feeling of relatedness. Other students mentioned that the pathways might limit their interactions, as well as the sharing of perspectives. Robert stated that “while it focuses the course on [students’] goals, it limits learners’ perspectives and potentially limits their desire to change goals.”

### ***Intrinsic motivation***

We asked the interviewees to report the factors that motivated them intrinsically in these two online courses. Interviewees from the one-size-fits-all course found *instructors’ facilitation* as a motivating factor and an influencing factor that motivated them. Interviewees from the personalized course considered *personalized readings* as motivating factors because they could conceptualize the application for those readings in 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*, whereas interviewees from the personalized

course found the curriculum personalized and relevant to their learning without assistance from instructors (see Table 4).

### **Instructors' facilitation**

In this study, *facilitation* refers to assisting students in learning and completing the objectives of the course through serving as a guide as students complete the course activities.

Interviewees in the one-size-fits-all course indicated they felt motivated when they received *effective facilitation from their instructors*. They believed their instructors were flexible to modify the course to meet their needs and interests. Some interviewees mentioned that, without the instructors' facilitation, they would have dropped the course. Katherine called her instructor, "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 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, instructors' facilitation and interaction played a major role in motivating learners in the one-size-fits-all online course. Maya, an interviewee from the personalized course, said, "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."

### **Personalized reading**

Personalized reading content, in the personalized course, was a key motivating factor for students in the personalized course. Surprisingly, interviewees from this course mentioned they wanted more personalized readings that target the learning pathways. This was not the case 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 to apply what she learned to her current 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 (corporate training pathway) as 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, and the tasks must meet their short- or long-term goals. In this study, *curriculum relevance emerged* as a motivating factor for the majority of the interviewees from both courses.

**One-size-fits-all course.** Even though the one-size-fits-all course did not include relevant curriculum for students who have interests in other areas than K-12 teaching and learning, instructors could successfully help students engage during their learning in the course and feel motivated. Findings showed that instructors assisted and facilitated their learning, and they could successfully ensure the readings, assignments, and the focus of the course met their learning needs and interests. They indicated that instructors were motivating them to learn by engaging with them in the discussion boards and helping to align the materials, contents, and assignments toward their learning preferences. Katherine, who enrolled in the one-size-fits-all course, did not enjoy the focus of the course 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.” Only Kim mentioned that the one-size-fits-all course provided her with relevant learning materials that met her needs and interests, which is teaching in K–12 settings.

**Personalized course.** Participants from the personalized course indicated that the curriculum was personalized to their learning, which provided relevant learning content that could be applied in their workplace. Amelia said, “We like things to be relevant. We like to be able to apply it, and it was a 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 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 the course provided relevant materials that assisted her learning and in her profession. 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.

Course reflections analysis also showed that the personalized course provided relevant and aligning content and resources for students’ needs and interests. The majority of the participants indicated that the course enhanced their learning by providing relevant curriculum (e.g., “I thought the space to apply the learning to my own pathway was fun and relevant to my own work” (Jennifer), “Being able to choose my focus on corporate training made this course immediately relevant” (Daniel), and “This course utilized relevant resources that can be useful in creating and partnering for learning-centered pedagogies in the years to come” (Jessica). By comparing the *curriculum relevance theme* from both instructional approaches, the findings showed that, without intervention and help from the instructors, students in the personalized course found the curriculum to be *personalized* and *relevant* to their learning needs. Interviewees indicated that they felt motivated and engaged when they found the learning materials were aligned with their learning needs and interests.

R2 – How do students’ learning experiences differ between a one-size-fits-all online course and an online course with a personalized learning approach?

We examined interviewees’ perceptions of their learning from both instructional approaches: the one-size-fits-all course and personalized course. The interviews illuminated several themes that represent how students’ perceived their learning in these two instructional approaches. We compared themes from both instructional approaches to reveal whether the personalized learning approach affected students’ learning and provided positive learning experiences and engagement. From the personalized course interviews, we found *personalized learning approach*, *engagement*, *learning choice*, *learning interest*, *learning control*, and *deeper learning* to be the factors that showed positive and effective experiences students perceived during their course time. These factors revealed that students’ reported experiences in the personalized learning course were positive, and the personalized learning approach could provide better learning opportunities than the one-size-fits-all course approach through enhancing students’ learning needs and choices, supporting their learning interests, and allowing for more learning independence. Interviewees from personalized course found the course design supported their online learning and was more effective (see Tables 1 and 4).

Themes from the one-size-fits-all course showed the need to personalize this particular course to address students’ learning needs and meet their educational background. When we 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 their learning needs. Therefore, the *students unsatisfied with the course content and course approach* theme emerged from these three interviews. This theme showed that the students who took this course did not have interests or needs in K–12 settings, which led to negative learning experiences.

### ***Students unsatisfied with the course content and course approach***

This theme emerged from interviews and course reflections analysis from the one-size-fits-all course (see Table 4). We asked participants 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 and 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. Despite the fact that 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, and it actually became quite fun to do all the research to figure out how would I teach a high school kid this subject?

Lisa, a course reflections participant, mentioned that she did not find the focus of the course and the topic relevant to her learning needs. She said,

I really think the phrase K–12 classroom should be in the course description. I might have still ended up here, but, for the uninitiated, it wasn't particularly obvious where the focus would aim ... I did not prefer to spend class time on that topic.

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 provided her with relevant reading materials even though the course focused only on the K–12 context. She used the course materials and contents to support her learning needs. In the end, she could successfully design a project that aligns with her profession and her interests and learning focus.

Emily had an interest in higher education and wanted to attain 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 the clarity of the assignments. She also complained about the focus of the materials in the course, which was 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 contents 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. We asked the interviewees to share their experiences in regard to the pathway design and whether this design could address their learning needs and expectations from the course. The results showed that the *personalized to learners*

*strategy* using pathways design was perceived as effective for students to align the learning with their needs and interests. To compare this theme with *students unsatisfied with the course content and course approach* theme, students needed personalized learning as an instructional approach to provide a flexible course aligned to their learning needs. The results also indicated that students liked the *personalized pathways* design and enjoyed learning from this method; however, it was challenging for some learners, who were the only learners in that pathway. Participants such as Emma felt motivated and engaged when they found the pathway met their learning needs and interests. Emma 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 [sic] for a lot of additional readings or information.

Therefore, Emma indicated that the course successfully provided the needed learning pathway that helped her focus on what she needed from the course. Amelia indicated that readings (e.g., textbook, articles, personalized case studies) and assignments (e.g., course project) were personalized components for her learning. Maya found that the course personalized and aligned with her learning needs and interests. David found the personalized course as effective and has 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 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.

The course reflections analysis also demonstrated that almost all students enjoyed their learning in this personalized course. Course reflections participants stated, "I really liked the pathways. This was the first class where I could do work and readings based specifically on what I want to do with my degree" (Kathryn), "I really appreciated your approach with regard to branching options depending on our chosen focus (K-12, Higher Education and Corporate Training)" (Daniel), "I enjoyed the way it had pathways specific to the goals of each type of learner in the course" (Justin), and "I like the notion of differentiation" (Erika). (Kelli) mentioned, "I liked that there were different learning pathways. There are people from various backgrounds earning this degree, so it makes sense to narrow it down so that people can focus on their specific line of work."

## **Learning outcomes**

### **Online learning engagement**

We asked interviewees from both courses to report the factors that contributed to their engagement. In particular, we asked the interviewees whether the *course design, instructors, learning content, teaching and learning strategies, and the course activities and assignments* contributed to their online learning engagement. The findings showed that students perceived instructor facilitation (e.g., "Instructors were always a prompt with their feedback," Emily), course project (e.g., "I did find it super helpful that the final project was in parts," Amelia), and feedback (e.g., "Seeking feedback from peers and receiving frequent feedback from [instructor], definitely helped me learn and feel more engaged," Jennifer) appeared from both courses as engagement factors that contributed to student learning.

*Personalized readings* were perceived to be a contributing factor in the personalized course. Interviewees from this course stated that the readings engaged and motivated them to accomplish

their learning needs. 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 [sic] around and think about what it would look like in my classroom.”

### *Perceptions of learning choice*

The interviewees reported that the course successfully provided more learning choices that directed students’ learning toward their interests. Students personalize their learning by selecting the focus of the course and making progress 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.” Anna, a course reflections participant, said, “I think the ability to choose pathways really helped ensure that I had a group of individuals that I could turn to for feedback and perspective with experience in my pathway.”

In comparison, some interviewees from the one-size-fits-all course indicated the need to provide learning choices, whereas others thought the course provided learning choices for them. For example, Katherine said,

The instructor tried to make this class fit me as far as corporate training, but I never saw the connection. I never got the connection, so personalized training would be great. Instead of having to follow a specific curriculum, have options. So I can choose this and this instead of you know ... going where I want to go with it and not just what the school wants me to go with. I think it would be awesome.

However, Kim mentioned that the course project was designed to provide learning choice. She 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.”

### *Perceptions of learning interest*

Supporting students’ interests was one of the ultimate goals of implementing personalized learning as an instructional approach. Therefore, we examined this theme from both the one-size-fits-all course and personalized course. The interview results showed that personalized learning enhanced students’ learning interests when provided learning pathways that included content that addressed 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 the 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):

Well, it allowed me to focus on what I’m familiar with and comfortable 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, students from the one-size-fits-all course did not report that the course enhanced their interests. Emily was hoping that the course was aligned with her learning interests, stating,

I really enjoyed when the content ... when I had the opportunity to make the content personal for me or I was able to customize the content for me. I’m interested in science education. I’m also 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; that’s what really help [sic].

### ***Perceptions of personal goals***

We designed the personalized course to provide the opportunity to all students to meet their own learning goals. We asked students to set their personal goals during the first week of the course, and we asked them to reflect upon these goals and whether they met them at the end of the course. Both interviews and course reflections analysis revealed that almost all students in the personalized course met their personal goals. Emma and Amelia responded that they met their learning goals in this course. 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.

The course reflections participants stated, “I think this course was excellent in helping me achieve my personal goal, and I am glad I took it” (Samuel), “I do think I've succeeded in meeting this goal as I've really learned more about general best practices to encourage learner-centric training” (Diane), and “I feel what I learned surpassed my goals for this course” (Nicole).

### ***Perceptions of learning control***

One of the personalization goals was to enhance students' learning control and independence (Bray & McClaskey, 2016; Watson & Watson, 2017). Interviewees from the personalized course mentioned that this course allowed for more learning control and independence. Emma said,

I definitely feel like I was able to sort of take control of my learnings [sic], 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 her 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 had control over their learning outcome; however, it was through the course project. As indicated previously, interviewees from the one-size-fits-all course found the course project as supportive for their feeling of autonomy and allowed them to take control of their learning.

### ***Perceptions of deeper learning***

In addition to students' perceived satisfaction with the course, the students' reported they learned more, and more deeply, because of the course design. Specifically, because the personalized course provided learning pathways to enhance deeper learning (Zheng, 2018), the students were self-motivated to learn more about the topics with which they were interested. Students' perceptions of their deeper learning were positive, and they mentioned that the personalized course assisted them to learn deeply by (a) directing them to focus on what they needed to learn, (b) aligning the course content with students' learning backgrounds and interests, and (c) assisting students to conceptualize the applications of the course topic in their work context. 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.

Amelia also indicated that she learned deeply in the personalized course, and it occurred through the course project. As did Maya, who indicated that the personalized course helped her

learn more deeply: “With deeper learning, 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 the opportunity to learn deeply and better 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 helped solidify the understanding of the subject.

One course reflections participant said, “The format of the class allowed me to broaden my horizons while also staying inside of my comfort zone” (Andee).

In the one-size-fits-all course, students did not perceive much deep learning. Many students mentioned that they did not figure the applications of learner-centered approaches in their contexts. Charlotte said, “I still don’t see how this pedagogy would apply to the training I do.” William said, “I would have loved to have studied more in depth the pedagogies.” Ethan said, “I think it would be helpful to dove into this [sic] tools a bit more.” Linda said, “I was unduly stressed attempting to adapt an instructor-led corporate learning course with a partnering pedagogy design plan.” Sophia mentioned that she did not find the course helpful for deep learning: “It felt a bit like I was looking for a needle in a haystack in searching for appropriate tools for my lesson while at the same time attempting to design a lesson that would work for all three parts.”

The results of both research questions, research question 1 and research question 2, are provided in Table 4. Table 4 provides a comparison between the qualitative themes and factors from both courses, including the major themes and subthemes, and factors based on the two courses: one-size-fits-all and the personalized course.

**Table 4.** Comparison between qualitative themes and factors from both courses

Themes and Factors Comparison (Interviews $N = 8$ ) (Course Reflections $N = 64$ )				
Major Themes	Subthemes	Factors-Subfactors From One-Size-Fits-All- Course	Factors-Subfactors From Personalized E-Learning Course	Data Sources
SDT (Research Question #1)	Feeling of autonomy	<ul style="list-style-type: none"> <li>– Course project</li> <li>– Course project design</li> <li>– Instructor support</li> </ul>	<ul style="list-style-type: none"> <li>– Personalized course design</li> <li>– Learning pathways</li> <li>– Content alignment</li> </ul>	Interviews
	Feeling of competence	<ul style="list-style-type: none"> <li>– Course project</li> <li>– Flexibility</li> <li>– Authenticity</li> <li>– Relevance</li> </ul>	<ul style="list-style-type: none"> <li>– Course project</li> <li>– Flexibility</li> <li>– Authenticity</li> <li>– Relevance</li> <li>– Personalized course design</li> <li>– Learning pathways</li> <li>– Challenging content</li> </ul>	Interviews
	Feeling of relatedness	<ul style="list-style-type: none"> <li>– Interaction with instructors</li> <li>– Lack of interaction between students</li> </ul>	<ul style="list-style-type: none"> <li>– Interaction with instructors</li> <li>– Lack of interaction between students</li> </ul>	Interviews & course reflections
	Intrinsic motivation	<ul style="list-style-type: none"> <li>– Instructors’ facilitation</li> <li>– Curriculum relevance</li> </ul>	<ul style="list-style-type: none"> <li>– Personalized readings</li> <li>– Curriculum relevance</li> </ul>	Interviews & course reflections
Online Course Design and Instructional Approach (Research Question #2)	Perceived learning & experiences	<ul style="list-style-type: none"> <li>– Students unsatisfied with the course content and course approach</li> </ul>	<ul style="list-style-type: none"> <li>– Personalized learning approach</li> <li>– Learning outcomes</li> <li>– (<i>Learning choice, learning interests, personal goals, learning control, and deeper learning</i>)</li> </ul>	Interviews & course reflections

## Discussion and implications

The personalized learning approach derives its principles from theories that support learner control and independence of learning and focuses on the learner-centered paradigm (Rickabaugh, 2012; Watson et al., 2012; Watson & Watson, 2017). Personalized learning provides a flexible learning environment that can be implemented in higher education and in online learning environments (Redding, 2014). It prioritizes all learners' needs and interests and allows for tailoring and adjustment to meet personal learning goals. We designed an online course using personalized learning principles that were introduced by Watson and Watson (2017) to enhance students' psychological need satisfaction (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) and intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). This personalized course provided flexible learning pathways that aligned with students' learning needs and interests. We used the previous design of this course, which was a one-size-fits-all course, as the comparison course for the personalized course (intervention).

From this research, we found that, overall, students in the PL course held positive perceptions toward the PL course design and felt that this design helped support their feeling of learning autonomy, increase their feeling of competence, and enhance their intrinsic motivation. However, we found that the PL course design did not support the feeling of relatedness. The PL course design also contributed to students' online learning experiences and learning outcomes by meeting their learning needs and interests. In contrast, students in the one-size-fits-all course had negative perceptions and felt unsatisfied with the course approach and how their learning needs and interests were met. These results (positive perceptions of autonomy, competence, and intrinsic motivation) are connected to the course design decisions (e.g., personalized learning pathways, personalized readings, personalized feedback), as shown in Table 1.

## Self-determination theory

One of the main purposes of this research was to identify the potential of personalized learning as an instructional approach to providing learners with relevant and personalized learning experiences that address learners' interests and needs, better supporting their basic psychological needs (e.g., feelings of autonomy, competence, and relatedness; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). Theoretically, a personalized instructional approach should lead to an increase in students' feelings of autonomy, competence, and relatedness, which would further affect their intrinsic motivation, resulting in effective and positive e-learning experiences. These three SDT components are additive and correlate with one another to increase or decrease the learners' intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000).

These findings indicate that both students in the one-size-fits-all course and the personalized course perceived feelings of autonomy and competence. The *course project* was well designed in supporting students to feel autonomous and competent within both courses. However, students in the one-size-fits-all course stressed the importance of instructor facilitation in tailoring the course assignments to their interests while still expressing some frustration with the lack of relevance of some course assignments and activities with their personal learning goals. So although students still perceived competence and autonomy, it was largely reliant on instructor support rather than the actual course design, and the lack of relevant content was disappointing to students. This finding highlights an important implication that, in non-personalized courses, when given the freedom to do so, instructors can play a large and impactful role in working with students to better align course activities to students' individual needs and goals.

Contrasted with this, students from the personalized course mentioned that the *personalized learning* components (e.g., personalized learning pathways, personalized readings, personalized feedback) were the key factors in their feelings of autonomy and competence. They also stressed the relevance of the course content in meeting their personal learning goals. We gave students

the opportunity to think about their learning focus and follow the pathway that best addressed their learning needs, which supported their feelings of autonomy and competence. This result aligns with what prior researchers already identified, which indicates that providing personalization opportunity, provision of choices, and a relevant curriculum will result in an autonomous-supported environment (Assor et al., 2002; Lee et al., 2015; Patall et al., 2010; Ryan & Deci, 2000). This indicates that incorporating personalized course components places less focus on the quality of the instructor, perhaps allowing for more consistent benefits for students or supporting the promotion of students' feelings of autonomy and competence, even in structured programs that allow their instructors less freedom to improvise and alter course activities.

The feeling of relatedness is the feeling of belonging to the social environment (e.g., online learning) and maintaining a close relationship to other students or instructors in the learning environment (Garn & Jolly, 2014; Kowal & Fortier, 1999). Rienties, Tempelaar, Van den Bossche, Gijsselaers, and Segers (2009) recommended supporting learner relatedness in online technology-rich environments to motivate learners and foster educational outcomes. Butz and Stupnisky (2017) found that using online discussion as an intervention can promote learner relatedness and improve students' self-efficacy for developing relatedness with others in the course. An interesting finding in this study was the lack of perceived relatedness among the students despite very different approaches to the online discussion in the personalized and one-size-fits-all courses. For students in both courses, they perceived relatedness to their instructor but not to their peers. We found instructors' communications through videos recordings to be an effective strategy to support students' feeling of relatedness and competence. Instructors from both courses 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 to their environment and increased their feeling of competence. This result aligns with Howland and Moore (2002), who suggested that students will feel isolated when they are left without support for interpreting course assignments. Accordingly, instructors must show interest in supporting students' learning, which will increase their feeling of relatedness (Connell & Wellborn, 1991).

With regard to their fellow students, this sense of relatedness was lacking, regardless of the course. In the one-size-fits-all course, students felt a bit lost among the larger discussion, and they had difficulty finding helpful discussion with their peers that support their relatedness. The personalized course sought to make discussions more personalized by having smaller discussions among only students who shared the same personalized learning pathway. However, students in this course noted that the inability to discuss with students from other pathways limited their opportunities to find other students who provided helpful contributions to the discussion. Thus, although discussions were more targeted, students did not find them helpful or contributing to a sense of relatedness. Similarly, Hartnett (2015) found that when students were grouped into small discussion groups, such as in the personalized learning course in our study, the students lacked for interaction because the students tended to only interact with students who might work within their small groups. An implication therefore is that, although personalizing discussions for students to increase relevance theoretically aligns with recommendations, restricting discussions to these smaller groups can actually stifle discussion and a sense of relatedness with other students. However, having discussions with the larger class as a whole can result in the same lack of relatedness as well. Designers should consider how to construct an optimal approach that neither overwhelms students with large numbers of posts that are difficult to digest and connect to nor restricts their discussion to a smaller group of students, which might therefore limit their access to quality posts that come from those students outside of their group. Having a learning management system that highlights top influencers in the discussion or allows students or instructors to upvote the discussions that are most impactful and interesting could be a way to highlight the best discussions and recognize those students making the strongest contributions to the discussion. Likewise, although some discussions might be personalized to improve their relevance, these



should not entirely replace interaction with the larger class. Future research is needed to better identify at what point discussion groups become too small or focused to be effective, as well as how both discussion board features and instructor discussion facilitation can optimize student interaction and discussion quality to promote learning and student relatedness.

### **Personalization's impact on learning and motivation**

When examining the perspective of students regarding the personalization of the course, the results clearly indicated the shortcomings of the one-size-fits-all course when compared to the personalized course. Students in the one-size-fits-all course consistently noted difficulty and frustration with aligning the course to their personal interests and learning goals. Although the students did highlight how their instructors were helpful in trying to help them and also noted that the ability to choose the topic of the final project allowed them a degree of personalization that they appreciated, by and large, it was clear that the perceived lack of relevance for students who were not focused on a K–12 context was problematic for their engagement, motivation, and learning. These students were largely focused on completing the course to earn the grade and course credits needed for their degree, but the learning was shallow and largely not relevant to their future professional practice. Relevant curriculum is a critical factor in online learning environments, and students lose interest and motivation when they find the assigned tasks are not relevant to their learning and to their own lives, which may lead to them failing or dropping courses (Park & Choi, 2009), which this study's participants also indicated.

In contrast, the personalized course students highlighted the benefits of personalized readings and projects, describing how this allowed the course to be highly relevant and aligned with their personal goals and professional contexts. Although we noted some frustration when discussions and peer engagement were negatively affected when students found themselves in pathways with few or no other students, the benefits of the personalized approach to their learning and engagement were clearly reported.

The perceived benefits of having choice over their own learning aligns with prior research that supporting student choice enhances their learning control and increases their psychological need satisfaction, especially in regard to feelings of autonomy and competence (Cordova & Lepper, 1996). Similarly research has shown that aligning learning content with student interests results in better learning (Bernacki & Walkington, 2018; Hidi, 1990; Krapp, Hidi, & Renninger, 1992; Walkington, 2013), engagement (Ainley et al., 2002), motivation (Deci & Ryan, 2000), and increases in cognitive and affective functioning (Ainley et al., 2002). This study contributes to what the personalized learning literature suggests: providing personalized instruction and experiences support and enhance students' learning control and independence (Barr & Tagg, 1995; Demski, 2012; Watson & Watson, 2017) while facilitating information processing and deeper learning (Zheng, 2018).

The participants perceived this course to be effective in meeting their learning needs and providing instructional content that aligned with their learning choices and interests. The results indicate that the personalized course students' perceived that their interest was enhanced, and they were engaged during the course. The findings thus suggest that students from different learning backgrounds, different focuses, and different learning needs could benefit from a course *personalized to learners'* needs and interests.

### **Personalized course design and the role of technology integration**

Personalizing an online course requires an understanding of students' needs and interests so the course parameters and objectives can better be aligned to meet those interests. In this study, the focus of personalization was on aligning the course topic and content toward students' needs and

interests using a *personalized to learners strategy* (Barr & Tagg, 1995; Rickabaugh, 2012). The design and implementation of personalized learning as an instructional approach was based on learner analysis decisions. Therefore, replicating the personalized learning approach investigated in this study in other courses requires further research to explore the potential of implementation to provide personalization opportunities within different courses and different higher education levels. Online learning instructors could benefit from the study's findings through replicating the model presented and designing, developing, and implementing personalized courses that provide students with more learning choices and some degree of learning control. Instructors could provide multiple learning pathways in courses that have potential students with different learning backgrounds, needs, and interests to provide learners with the needed skills and competencies that align with their learning focus. This replication could be implemented in online courses, MOOCs, as well as face-to-face courses.

We suggest that when designing online courses, instructors and designers should implement personalized learning principles in the design and development process to provide online courses that are personalized toward individuals' learning needs and interests. Some potential design strategies include providing options for students to choose (e.g., pathways or tracks) that allow them to explore content relevant to their learning interests or offering online discussion activities (e.g., in learning management systems (LMSs), on social media platforms) that allow students to interact with peers who share similar interests. Digital resources can be integrated to enrich individual learning experience based on their interests. Another strategy implemented in this study was supporting personalization in online learning through an "online course content repository" that allows learners to browse and select the needed course content, instead of providing fixed content for all learners. Finally, web-based technologies such as digital learning resources (e.g., blogs, wiki, web publishing, e-portfolios) could aid in implementing personalized learning in an online learning environment.

Without advanced technology that supports personalization of instruction toward the learner needs (e.g., adaptive learning technology), it is important to conduct learner analysis to understand all students' needs and interests within the course parameters and objectives. Then, instructional designers should identify the personalization strategy (e.g., *personalizing to the learner*, *personalizing with the learner*, *personalizing by the learner*) to design and prepare the pathways that might serve learners' needs within the course. Within the personalized pathways, content can be tailored toward learners' needs. Instructors can then integrate a variety of technologies that support the learner-centered environment to enhance and support the personalized environment. Designers and instructors could also offer students the option to determine the pace of their learning within a specified course. Another instructional decision implemented in this study was allowing students to develop assessments of their learning.

Personalization through LMSs sometimes can be challenging. However, learner-centered technology platforms (e.g., adaptive technology, competency-based technology platforms) could be integrated to provide opportunities for learners to personalize their learning through creating learning pathways and learning profiles that facilitate best learning practices. Authoring software might enrich personalization in online learning environments. Designers could develop online learning content that allows learners to customize the content and show real-time progress to provide learners with the opportunity to navigate their learning toward mastery and allow instructors to observe and mentor students' learning without intervening in their independent learning (Matuk, Linn, & Eylon, 2015).

## Limitations

There are limitations to both this research study and to the development of a personalized online course. The first limitation of the personalized learning course was the incorporation of

personalized learning components (“instruction that is paced to learning needs, tailored to learning preferences, and tailored to the specific interests of different learners”) rather than designing a fully personalized online course from scratch. The program standards and requirements limited the course design to time-based progression, which limits one to designing an online course that is more self-paced. The second limitation to personalizing the online courses was implementing this approach without the assistance of advanced technology platforms that support greater personalization (Watson & Watson, 2017) because the course was hosted on a standard CMS that does not provide personalized learning features. Third, designing and implementing a personalized online course is not an easy task and requires additional time and effort on the part of instructional designers and instructors seeking to implement similar approaches in their own courses.

In regard to the limitations of the study and its methods, the results were based on student perceptions of their learning rather than more objective measures. Additionally, the participants were instructional design students familiar with the concept of personalized learning, which could have affected their responses to the PL implementation in an online learning environment. Additionally, the results were not fully triangulated because some implications relied only on one data source (interview). Finally, the implications of this study are based on a specific course design offered in a specific program; therefore, although they may be beneficial to informing others’ efforts in designing more personalized online courses in their own contexts, they are not broadly generalizable across all contexts.

## Conclusion and directions for future research

In this study, we investigated the potential of personalized learning as an instructional approach in online learning courses. We designed an online course using personalized learning principles to align the content and assignments with students’ learning goals and interests to support students’ psychological need satisfaction and intrinsic motivation. Furthermore, we applied an SDT framework to investigating students’ psychological need satisfaction and intrinsic motivation. We also investigated students’ perceptions of their experiences in the personalized course and compared the results with students’ perceptions in the one-size-fits-all course.

Through this study, we add to the literature the idea that implementing personalized learning principles in online learning courses can support students’ perceived psychological need satisfaction (autonomy and competence), increase students’ perceived intrinsic motivation, and enhance students’ perceived learning engagement, leading to positive online learning outcomes. Overall, the personalized learning interventions enhanced students’ learning needs and interests, allowing for more learning control and leading to students’ increased interest in learning and understanding the course topics.

The results of this personalized learning instructional intervention indicated that supporting the three basic needs could enhance students’ intrinsic motivation and support well-being within the social learning environment (Cordova & Lepper, 1996; Stefanou, Perencevich, DiCintio, & Turner, 2004). Lack of interaction remains as an issue in personalized courses, and students felt that their interaction with one another was low. Online discussion boards did not help in supporting the students’ interactions and feeling of relatedness in these online courses. Students felt that their interactions with their peers lacked meaning in both courses, and they did not feel engaged in discussions (Howland & Moore, 2002).

Little empirical research has been conducted to investigate the effect of personalized learning as an instructional approach on students’ motivation and psychological need satisfaction within online learning courses. We recommend further investigation of online course personalization to extend the knowledge of implementing PL in online learning. In addition, self-directed learning should be investigated because it is a critical skill for learners in personalized learning courses.

Moreover, personalized learning challenges should be studied and addressed to achieve a personalized course design that can be applied in online learning courses. Finally, this study could not provide a fully personalized online course that allows students to progress on their own time (e.g., self-pacing). We further recommend that this obstacle be addressed to allow students to fully control their learning to better support their learning choices, interests, and needs and align with their learning backgrounds in future studies.

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## Appendix A. Interview Protocol

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### 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? How about 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?

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(continued)

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. Learning objectives, instructional approaches, and instructional content (and its sequencing) all may vary based on learner needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated.
  - 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 the EDCI 568 course, and here are several questions that will rely on those responses:

1. How did you learn what you needed from the 568 course?
2. You said this course did/did not help you 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 four pathways design; can you explain why you liked/disliked this design?
8. How did the course content align with your personal goals?
9. Did this course help you take control of your learning? How?
10. Did you meet your personal goals for learning during this course?

## Appendix B. Definitions

Terminology	Definition
Personalized Learning	<i>Personalized learning</i> refers to “instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) all may vary based on learner needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated” (Department of Education Office of Educational Technology, 2016).
Self-Determination Theory	Per SDT, an “understanding of human motivation requires a consideration of innate psychological needs for competence, autonomy, and relatedness” (Deci & Ryan, 2000, p. 227).
Self-Determination	<i>Self-determination</i> was defined as a combination of skills, knowledge, and beliefs that enable a person to engage in goal-directed, self-regulated, and autonomous behavior (Field et al., 1998).
Autonomy	<i>Autonomy</i> refers to “being self-initiating and self-regulating of one’s own actions” (Deci et al., 1991, p. 327).
Competence	<i>Competence</i> refers to “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).
Relatedness	<i>Relatedness</i> refers to “developing secure and satisfying connections with others in one’s social milieu” (Deci et al., 1991, p. 327).
Intrinsic Motivation	<i>Intrinsic motivation</i> 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).