Pre-Service Teacher Perceptions of Virtual Just-in-Time Learning and Delivery Using Online Media Literacy Modules

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Abstract: This study focused on the impact that online “just-in-time" learning modules had on teacher candidates’ beliefs about media literacy as well as their personal beliefs about learning in an online environment with online learning modules. Our findings indicate that the delivery of a self-paced online learning module may be an effective solution for integrating content into otherwise “full” curricula. In order to most effectively implement this concept, however, programs should be prepared to overcome the negative perceptions that teacher candidates may have regarding online learning, particularly in a post-pandemic era.

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Introduction

Today's school-age students are immersed in a world fraught with mediated messages and are more connected to digital media than at any other time in history. Despite their connectedness, school-age students cannot adequately evaluate mediated messages and content (e.g., Steeves, 2014; Wineburg et al., 2016), have limited knowledge about the commercial aspects of online sites and platforms (Steeves, 2014), cannot effectively reason about the information found on the internet (McGrew et al., 2017), and have difficulty analyzing various types of mediated messages (Wineburg et al., 2016). Over the course of a year and a half, the Stanford History Education Group administered tasks meant to assess students' ability to reason about information they saw on the Internet. The researchers found that 82% of middle schoolers believed that sponsored content was a real news story and not an advertisement. When asked to choose the most reliable source, more than 70% of high schoolers selected the sponsored content. When asked to evaluate multiple sources to evaluate a claim, only 6% of college students and 9% of high school Advanced Placement students could identify the "backer" of an article. Most students accepted the website as trustworthy. Authors of this report concluded, "Overall, young people's ability to reason about the information on the Internet can be summed up in one word: bleak" (Wineburg et al., 2016, p.4). Between 2018 and 2019, that same group administered an assessment to measure high school students' ability to evaluate digital sources and found equally disturbing results. Among the findings, two-thirds of high school students could not tell the difference between news stories and ads and 96% had difficulty assessing the credibility of a website. Fewer than 3% of students earned full credit on all 6 of the assessment tasks. The authors concluded that "students remain unprepared to navigate the digital landscape" (Breakstone et al., 2019, p. 26).

According to the U.S. Media Literacy Report, media literacy, which is the "ability to access, analyze, evaluate, create, and act using all forms of communication" (National Association for Media Literacy Education, n.d.) is imperative to combat the "deliberate and politically-motivated disinformation campaigns" that shape public perceptions as well as public policy (Media Literacy Now, 2020, p. 5). Media literacy education can help to develop youth who can discern what is true, and help them to behave as "engaged citizens, responsible consumers, healthy individuals, and informed creators of content" (Media Literacy Now, 2020, p. 5). The authors of the report assert that media literacy skills are essential "if our children and our society are to meet the challenges of a rapidly changing global communications environment" (p. 4). In essence, media literacy education within our schools is more important now than ever.

Despite the need for and benefits of media literacy education, very few states in the U.S. have made media literacy education a priority. In fact, at this writing, only 18 states had some type of media literacy related legislation (Media Literacy Now, 2023). Without standards to guide curriculum development, teachers are left without much guidance when it comes to media literacy education. Teachers face other challenges integrating media literacy into their classrooms as well, including lack of knowledge and confidence in media literacy (Harvey et al., 2022), which stems from several factors including the limited preparation teachers receive in their teacher

education programs. While the standards from programs such as CAEP (Council for the Accreditation of Educator Preparation) and NCATE (National Council for the Accreditation of Teacher Education) emphasize important content, pedagogical and technology standards, they do not address media literacy (Mahmoudi et al., 2020; Meehan et al., 2015). The lack of standards in media literacy for preservice teachers equates to a lack of media literacy education required coursework for preservice teachers. In essence, preservice teachers are not getting the training they need to equip students with the skills they need to effectively analyze and create digital media, which is so desperately needed. In reality, most teacher preparation programs today do not include media literacy education within their curricula (Tiede et al., 2015) and those that do focus on teaching about various technology tools and how to use technology in the classroom (Salomaa et al., 2017), instead of on media literacy education pedagogy. Our preservice teachers may be digital natives who have grown up surrounded by technology and media, but this does not mean that they understand how to translate that knowledge into effective pedagogy. Nor does technology competence suggest that preservice teachers value the importance of media literacy integration within their future classroom (Gretter & Yadav, 2018). Even though preservice teachers might have high perceptions of digital literacy, they lack the skills to find, evaluate, create and communicate information (McAnulty, 2020).

Despite the lack of noted media literacy training for preservice teachers, teacher preparation programs that have found ways to incorporate media literacy training via workshops and through coursework have done so with successful results (Botturi, 2019; Cherner & Curry, 2019; Erdem & Eristi, 2022; Meehan et al., 2015; Schmidt, 2013).

Although not a part of our teacher preparation program, media literacy education is something that our institution felt important for teacher candidates to understand, particularly since the use of media among school-age children has dramatically risen over the past several years (Rideout et al., 2022), while school-age students' understanding of how to evaluate the media they encounter remains deficient (McGrew et al., 2017; Robb, 2017; Steeves, 2014). Our dilemma was how to provide effective instruction to our preservice teachers in media literacy education in a program with limited space in a short period of time. As an alternative modality, and an alternative to methods we have used in the past, online modules were developed to deliver "just-in-time" media literacy content to our students.

The technique of "just-in-time" emerged in the automobile industry where parts would arrive to the warehouse exactly when they were ready to be installed. This process reduced large inventories and expenses associated with storage and maintenance. This concept was applied to the way that people learn (Scott, 2022). Just-in-time learning (JITL) has similar benefits to what automobile companies experienced. For instance, pre-service teachers are trained in the needed competencies at the precise time they can use the skills when entering the classroom (Growth Engineering, 2022).

The framework for developing JITL requires six elements for success based on the work of Voss and other researchers (2022): task specific, concise, contextual, visual, diverse, and integrated. Figure 1 is a chart aligning the media literacy JITL modules developed for the study using this framework.

Figure 1

Development of JITL Media Literacy Education Online Modules

Task specific: the need for task-specific information that covered a range of common areas where students required additional support	Pre-assessment data revealed areas in which teacher candidates were insufficiently aware of media literacy, were untrained in the use of media literacy strategies, and lacked media literacy skills
Concise: providing resources that covered concepts quickly and efficiently	Pulling most relevant and streamlined resources together for the sole purpose of immediate use (Media Literacy Now, Center for Media Literacy, etc.)
Contextual: the need to understand the most efficient way to convey information	The media literacy online modules were delivered as SCORM embedded modules on the student's learning management system
Visual: resources need to be visual and engaging	Using iSpring® authoring software and PowerPoint resources to merge visual content following interface design principles
Diverse: resources can offer opportunities for knowledge extension	Classroom resources in media literacy were provided as teacher-ready tools and curriculum within the modules
Integrated: with other aspects of their educational resourcing	Embedded exercises within the media literacy modules were cross-curricular and grade band specific based on teacher candidates

(Voss, 2022)

Beyond the mere logistics for finding time to teach content that is urgent or newly required within a short amount of time, there are other benefits of online professional development for preservice teachers. According to the research of Kim (2018), online professional development offers the flexible, and, if designed well, the quality content that's personalized and relevant to an educator's needs. Specific to preservice teachers, having an online module dedicated to one area of development is a streamlined resource that could offer the same popular "on-demand" learning found on the TED talks, Khan Academy, Google, or YouTube. The difficulty that arises from college-developed modules is the student perception of being "graded," which can reduce intrinsic motivation to engage in enrichment learning (Ciampa, 2014). In these cases, such modules used for teacher training are often perceived as class requirements and not as "on-demand" teacher development and enrichments. To reduce the perception of required training, JITL that is designed to ignite a learner's cognitive curiosity may lead to more intrinsic motivation (Ciampa, 2014). In order to investigate how students perceived our media literacy online modules, the research questions were formulated to ask participants about impact, attitudes, and beliefs. The three questions this study examined were:

Research Questions

1. Do online learning modules impact teacher candidates' beliefs about

their media literacy skills and about teaching media literacy in the classroom?
2. What are teacher candidates' attitudes about learning via the online learning modules?
3. What are teacher candidates' beliefs about online learning in the PK-12 school environment?

Methodology

The current study seeks to understand whether an online learning module can impact teacher candidates' beliefs about media literacy education as well as to understand the attitudes teacher candidates have towards online learning in general and in their future classrooms. This study also seeks to understand whether the use of an online learning module can be an effective tool for "just-in-time learning." Data for the study were taken from pre- and post-self-assessment surveys, embedded within the online learning modules that asked teacher candidates to reflect upon various aspects of media literacy. Additionally, teacher candidates were asked to complete a pre- and post-survey about their beliefs about online learning.

Participants

The participants for this study included twenty-one teacher candidates (19 undergraduates; two post-baccalaureate) who were enrolled in the fall semester of college before their student teaching semester. In addition to finalizing required coursework, all teacher candidates were pre-student teaching one day a week. Of the twenty-one participants, 11 were working on PK-4 certification, while ten were working on various secondary certificates, including chemistry, English, mathematics, and social studies. Sixteen of the teacher candidates were female and five were male.

Treatment/Instrument

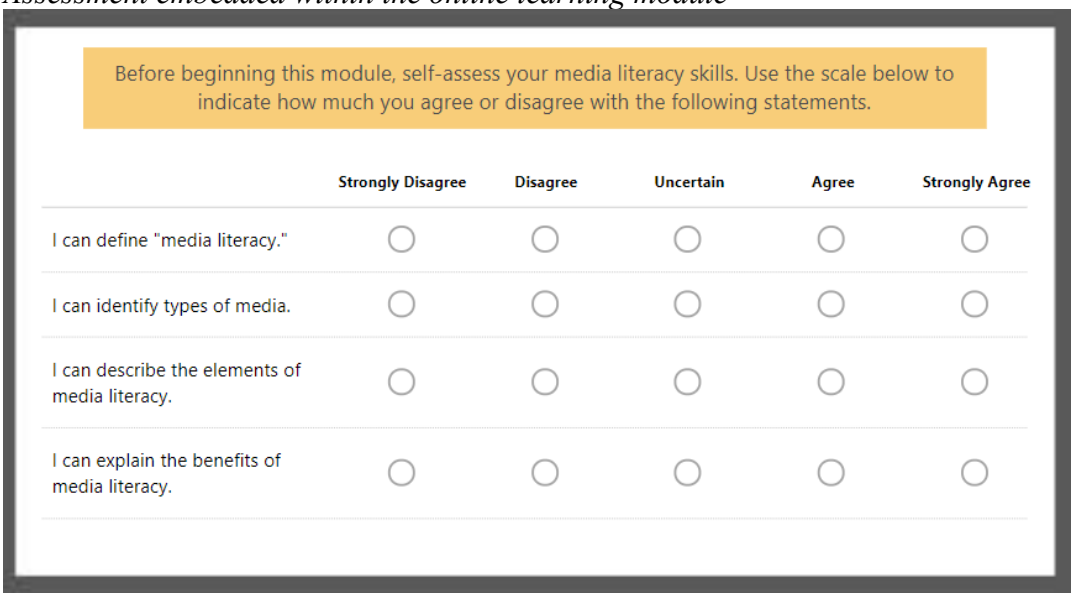
During spring 2022, a graduate student in the Instructional Design and Technology program at Saint Vincent College was tasked with creating three online learning modules using iSpring software. Given the time constraints, these modules focused on the most essential media literacy topics that could be immediately applied within learners' pre-student teaching placements. The first module, "What is Media Literacy (and Why is it Important)?" defined relevant media literacy terms, explained the elements of media literacy, and introduced the benefits associated with media literacy instruction. The second module, "Becoming a Media Literate Educator," provided strategies for critical media analysis, as well as considerations for effective and ethical media creation. The final module, "Media Literacy Classroom Strategies," included ideas for integrating media literacy topics across content areas and grade bands.

As supported by the work of ScuteInicu et al. (2019), each module followed a similar structure and design for consistency purposes. A title slide and a "Navigation/Help" section of the module oriented users to the beginning of each module. Following this introduction, the module prompted users to complete a survey, through which they reflected upon their current self-efficacy with each of the module's learning targets (see figure 2). Next, the module presented users with visual content, complemented by the designer's audio narration and iSpring's interaction features. Embedded after each content interaction was an assessment, in the form of a hotspot, matching, sequence, multiple-choice, or true/false question; an open-ended

essay response; or a dialogue simulation. At the conclusion of the module, users were presented with the same survey as at the onset, cueing learners to re-evaluate their efficacy of the learning targets.

Figure 2

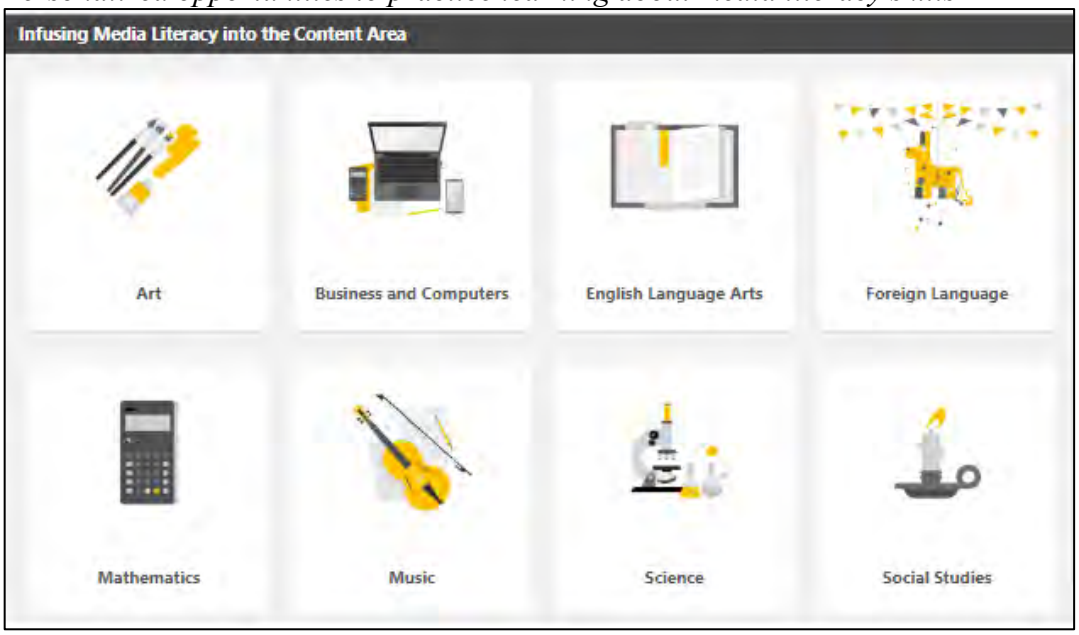
Assessment embedded within the online learning module



Congruent with the JITL Framework (Voss, 2022), iSpring's interactivity features were intentionally integrated throughout the module design to promote student engagement and to support visual learning. This set of features, including circle diagrams, tabs, and hotspot images, allowed aspects of the content slides to become "clickable" and dynamic for the learner. For example, Module 2 presented a hotspot graphic of a mock unreliable website. This hotspot slide allowed users to click hyperlinked markers around the graphic to read more about each "warning sign of unreliability." Similarly, Module 3 provided users with a media catalog of electronic "cards," where each card represented a different subject matter or content area. By selecting the content area most closely aligned to their certification areas, users could view specific ideas for infusing media literacy into their lessons (see figure 3).

Figure 3

Personalized opportunities to practice learning about media literacy skills



Also consistent with the JITL Framework (Voss, 2022), iSpring's assessment features were a focal point of module design, allowing for more efficient and relevant instruction. Embedded assessments utilized the feedback and branching capabilities of iSpring, prompting users to move to new content or review previous learning, depending on the demonstrated mastery of the material. For example, users who did not reach the 80% minimum score requirement on the Module 2 multiple-choice quiz received the message, "Please review the content and re-attempt the quiz when you feel ready." In contrast, users who did achieve the minimum score were provided with positive feedback and were permitted to continue within the module. To prompt users to better contextualize the media literacy material, the modules also utilized some of the more subjective assessment features of iSpring, including dialogue simulations, surveys, and open-ended responses. Module 2, for instance, provided a dialogue simulation in which users recommended classroom media literacy tips to a teacher "avatar" (see figure 4). Similarly, Module 3 required users to explore one of the provided media literacy resources and rate how likely they would be to use the resource in their own classrooms.

At the conclusion of the design phase, each module was uploaded as a SCORM package to the Schoology learning management system. This step facilitated easy student access and provided additional contextualization, as learners utilized the same learning management system throughout their teacher certification program. To ensure that requirements were satisfied in sequential order, Schoology's "Student Completion Rules" feature was enabled. Thus, users could only access Module 2 after the successful completion of Module 1.

Figure 4

Dialogue simulation from teacher avatar

Data Collection & Analysis

This study was created to explore teacher candidates' use of an online learning module as a way to learn about media literacy education in a self-directed "just-in-time" learning environment.

Teacher candidates who consented to participate in the study were introduced to the online learning modules early in the fall 2022 semester during their pre-student teaching seminar course. During the introduction, students were given directions on how to access and work through the modules. Students were given three weeks to complete the three learning modules. Researchers were able to gauge teacher candidates' progress on the modules; in order to ensure that the modules were completed on time, the researchers sent weekly reminder emails to the teacher candidates regarding their progress.

Data regarding teacher candidates' perceptions about media literacy was collected through a self-assessment survey ($\alpha = .85$) at the onset of each module and then once again at the conclusion of each module. Before being permitted to begin each module, participants were asked a series of self-assessment statements that included items such as, "I can define media literacy"; "I can create media literacy in a safe and responsible manner"; and "I can evaluate media literacy resources for the classroom" and then asked those same statements at the conclusion of each module. Using inferential statistics, data was analyzed to compare each of the three pre-module assessments to the post-module assessments to determine significance. Means and standard deviations for each module as well as for each statement were also calculated.

In order to get a sense of teacher candidates' perceptions about self-directed online learning and about their online learning beliefs, data was also collected through a pre-post survey administered at the onset of the study and then again at the conclusion of the study, which occurred three weeks after students were introduced to the online learning modules. The pre-post

survey contained statements such as, "I prefer online learning over traditional classroom instruction"; "Learning from online modules is difficult for me"; and "Teacher preparation programs should include how to deliver instruction online."

Findings

To explore the impact online learning modules had on teacher candidates' beliefs and attitudes about media literacy as well as to explore teacher candidates' beliefs about online learning, several analyses were run. Data taken from the pre- and post-assessments embedded within the three online learning modules provided an understanding of teacher candidates' overall beliefs regarding media literacy and teaching media literacy in their future classrooms; paired samples t-tests were run to provide information about whether these beliefs changed as a result of the learning that took place during the online modules. Pre- and post-test survey data that was collected outside of the online learning modules provided an understanding about teacher candidates' beliefs about online learning and, based on paired samples t-tests, whether those beliefs changed significantly following training using the online learning modules.

Online Learning Module Impact on Media Literacy Beliefs and Teaching

Research question 1 explored whether an online learning module can impact teacher candidates' beliefs about media literacy skills and teaching media literacy in the classroom. Response options for this measure ranged from 1 (strongly disagree) to 5 (strongly agree).

A paired samples t-test was performed to compare teacher candidate beliefs about media literacy at the onset of each online learning module and then again at the conclusion of each learning module. Findings indicate there was a significant difference in teacher candidate beliefs at the onset and conclusion of each of the online learning modules (See Table 1).

Table 1

Teacher Candidate Media Literacy Beliefs Before and After Completion of an Online Module

Learning Modules	*M*	*SD*	t value	df	*p*
Module 1					
Pretest	3.46	.371	-6.575	3	0.007**
Posttest	4.42	.085			
Module 2					
Pretest	3.78	.180	-12.122	2	0.007**
Posttest	4.64	.058			
Module 3					
Pretest	3.52	.169	-11.214	2	0.008**
Posttest	4.57	.050			

*p<.05; **p<.01

Descriptive analyses of survey items (see Table 2) indicate that teacher candidates had more positive beliefs about all areas of media literacy after engagement with the online learning modules. In Module 1, What is Media Literacy? the post-test scores indicate that teacher candidates reported the highest means for their ability to identify

types of media literacy (M=4.48, SD = .51) and to explain the benefits of media literacy (M=4.48, SD =.51). Analysis of Module 2, Becoming a Media Literate Educator, found that teacher candidates reported the highest means on the posttests for two variables: I can create media in a safe and responsible manner (M=4.67, SD=.48) and I can reflect on how media affects everyday life (M=4.67, SD=.48). Module 3, Media Literacy Classroom Strategies, found the highest means on the posttest for teacher candidates' ability to integrate media literacy strategies within their content areas (M=4.62, SD=.50).

Table 2
Teacher Candidates' Media Literacy Beliefs

	Pre-test			Post-test		
Survey Item	***n***	***M***	***SD***	***n***	***M***	***SD***
Module 1						
I can define media literacy	20	3.35	0.59	20	4.43	0.51
I can identify types of media	20	3.85	0.67	20	4.48	0.51
I can describe the elements of media literacy	20	3.00	0.73	20	4.30	0.57
I can explain the benefits of media literacy	20	3.65	0.49	20	4.48	0.51
Module 2						
I can critically analyze media message	21	3.57	0.68	21	4.57	0.51
I can create media in a safe and responsible manner	21	3.86	0.73	21	4.67	0.48
I can reflect upon the way media affects everyday life	21	3.90	0.77	21	4.67	0.48
Module 3						
I can identify developmentally appropriate media literacy strategies	21	3.38	0.59	21	4.52	0.52
I can integrate media literacy strategies within my content area	21	3.48	0.75	21	4.62	0.50
I can evaluate media literacy resources for the classroom	21	3.71	0.46	21	4.57	0.60

5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1=strongly disagree

Beliefs About Learning Using an Online Learning Module

Research question 2 asked teacher candidates to indicate various beliefs about learning online using an online learning module. Response options for this measure ranged from 1 (strongly disagree) to 5 (strongly agree).

Descriptive analyses of survey items (see Table 3) indicated that teacher candidates on average reported dissatisfied beliefs regarding learning online. Teacher candidates disagreed that online learning is as effective as learning in a face-to-face environment (M = 2.29, SD = 1.08), disagreed that forming lasting peer relationships in an online course is the same as in face-to-face courses (M = 2.38, SD = 1.21), and agreed that social presence is sacrificed during online learning (M = 4.05,

SD = .95). Teacher candidates responded that they did not prefer online learning over traditional classroom learning (*M* = 2.48, *SD* = 1.10). Despite the negative responses regarding learning online, teacher candidates disagreed that learning from online modules was difficult (*M* = 2.90, *SD* = 1.11).

Table 3
Teacher Candidates' Online Learning Beliefs

	Pre-test n=21		Post-test n=21	
Survey Item	***M***	**SD**	***M***	**SD**
I prefer online learning over traditional classroom instruction.	2.33	1.08	2.48	1.10
Learning from online modules is difficult for me.	2.95	1.21	2.90	1.11
Online learning is as effective as face-to-face learning.	2.05	1.13	2.29	1.08
Having lasting peer relationships occurs the same in online courses as in face-to-face courses.	1.76	0.75	2.38	1.21
Social presence (relationships, interaction, etc.) is sacrificed when learning is online.	4.00	1.23	4.05	0.95

5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1=strongly disagree

A paired samples t-test was run to determine if there was a significant difference between teacher candidates' beliefs regarding learning online before and after completion of the online learning modules. Although the means of several survey items improved slightly from pretest to posttest survey, findings indicate no significant difference between the pre- and post-test survey (See Table 4).

Table 4
Comparison of Teacher Candidate Online Learning Module Beliefs

Online Learning Module Beliefs	***M***	***SD***	**t value**	**df**	***p***
Pretest	2.62	.889	-1.752	4	0.154
Posttest	2.82	.726			

*p<.05; **p<.01

Beliefs About Online Learning

Research question 3 asked teacher candidates to respond to questions concerning their beliefs about online learning in the PK-12 environment. Response options for this measure ranged from 1 (strongly disagree) to 5 (strongly agree).

Descriptive analyses of survey items (see Table 4) indicated that teacher candidates on average reported positive

beliefs about online learning in the PK-12 classroom environment in several areas. The two most positive beliefs reported in the posttest were that online learning is valuable in all subjects and grade levels (M=4.52, SD=.50) and that teacher preparation programs should include instruction in teaching online (M=4.52, SD=.59). The two variables whose mean decreased at the posttest were teacher candidates' beliefs that online learning is effective for some content areas, but not for all content areas (M=3.62, SD=1.05, -.38) and that online learning is not appropriate for PK-12 (M=2.52, SD=1.05, -.05), finding that teacher candidates mostly disagree with this statement.

Table 5

Teacher Candidates' Beliefs About Online Learning in PK-12 Environment

Survey Item	Pre-test n=21		Post-test n=21	
	M	**SD**	***M***	**SD**
Online learning is valuable in classroom settings in all subjects and grades.	4.33	0.84	4.52	0.50
Delivering my instruction online is enjoyable and satisfying for me.	2.81	1.43	3.14	1.17
Online learning is effective for some content areas, but not all.	4.00	0.93	3.62	1.05
Online learning is not appropriate for PK-12.	2.57	1.22	2.52	1.05
Teacher preparation programs should include how to deliver instruction online.	4.71	0.45	4.52	0.59

5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1=strongly disagree

A paired samples t-test was run to determine if there was a significant difference between teacher candidates' beliefs regarding online in PK-12 settings before and after completion of the online learning modules. Findings indicate no significant difference between the pre- and post-test survey (See Table 6).

Table 6

Comparison of Teacher Candidate Online Learning in PK-12 Environment Beliefs

Online PK-12 Beliefs	***M***	***SD***	t value	df	***p***
Pretest	3.68	.945	.157	4	0.883
Posttest	3.66	.873			

*p<.05; **p<.01

Discussion

This study focused on the impact that online learning modules had on teacher candidates' beliefs about media literacy, their personal beliefs about learning in an online environment with online modules, and their beliefs about teaching online in a PK-12 setting. Although this study focused on media literacy content, we wanted to better understand whether the use of online learning modules might be an effective way to tap into cognitive curiosity and to deliver a variety of educational and pedagogical content to our teacher candidates.

In terms of whether an online learning module can impact teacher candidates' beliefs about media literacy skills and teaching media literacy in the classroom, we found that there was a significant increase in teacher candidates' beliefs about media literacy after they worked through the modules' content. Moreover, post-test mean scores found that teacher candidates' beliefs about their media literacy knowledge improved after engaging with the modules. Thus, the results of the study indicate that the use of online learning modules can be a beneficial way to not only learn about media literacy, but also to deliver just-in-time instruction. Our research is consistent with prior research that supports the use of online modules for use with undergraduate students as a method for learning content (Elliot, 2017; Hsu & Lin, 2020; Johnston, 2010). For instance, a study by Johnston (2010) that investigated whether an online module was an effective way for undergraduate students to learn about information literacy found that the "flexible, self-paced delivery of [an online module] was an effective way for students to develop information literacy skills" (p. 207). Similarly, Hsu and Lin (2020) discovered that preservice teachers' TPACK knowledge significantly increased after training using an online module; they concluded that online modules have "considerable potential for application to teacher training in other subjects" (p. 1). Based on our results, we concur that online modules can be useful in delivering content across a variety of subjects and can assist teacher preparation programs in fulfilling mandates and teaching content that can be self-directed and learner-controlled.

Our findings for personal online learning beliefs and beliefs about online learning in the PK-12 setting are mixed. There was not a significant increase from pre-test to post-test for either of these measures, which indicates that the online learning modules did not impact teacher candidates' beliefs in these areas. What we did learn was that there is some negativity surrounding teacher candidates' personal online learning beliefs. For instance, teacher candidates reported that they do not prefer online learning over traditional learning and that they disagree that online learning is as effective as face-to-face learning, citing that social presence and relationships are sacrificed in the online environment. In terms of their learning using online modules, although they did not find the modules difficult, they were undecided about the difficulty of using modules for learning, which may come as a result of their negativity towards online learning or with their unfamiliarity with this type of learning.

Although these teacher candidates expressed some negativity about their own personal online learning and did not find it satisfying to deliver instruction in an online learning setting, our findings indicated that they felt online learning was appropriate and valuable in the PK-12 setting. This finding is an interesting one because it helps us to understand the personal teaching preferences of our teacher candidates, where teaching face-to-face is more desirable than teaching online. There may be several reasons for this

preference. The teacher candidates in our study were freshman when the COVID-19 pandemic shuttered college doors; these students were required to transition to online learning with minimal to no training and were taught by professors who had minimal to no experiences teaching online. The online learning experiences the teacher candidates faced may have tainted their personal view of online learning. Moreover, due to the COVID-19 disruption, these same teacher candidates had gaps in the online teacher training that our institution provides all teacher candidates, which may have resulted in negativity towards delivering instruction in an online environment. As our results indicate, the teacher candidates agreed that teacher preparation programs should include training in how to deliver effective, engaging instruction online, which is consistent with research (e.g.: Luo et al., 2017; Smith & Schlaack, 2021). Unfortunately, the pandemic did not permit this to happen for this group of students.

Conclusion

The ability to integrate media literacy skills into classroom practice has become an increasingly vital skill for new teacher candidates. However, due to time constraints, state mandates, and required competencies, the inclusion of supplemental or enrichment topics, such as media literacy education, can be difficult for teacher education programs to manage.

Based on our results, we can conclude that the "just-in-time" delivery of a self-paced online learning module may be an effective solution for integrating these enrichment topics into otherwise "full" curricula. In particular, we believe that modules aligned to the just-in-time learning framework, as outlined by Voss (2022), show promise for teacher education programs. In order to most effectively implement this concept, however, programs should be prepared to overcome the negative perceptions that teacher candidates may have regarding online learning, particularly in a post-pandemic era. In overcoming these perceptions, teacher education programs may be able to more efficiently equip teacher candidates with the twenty-first-century skills required for success in today's classroom.

References

Botturi, L. (2019). Digital and media literacy in pre-service teacher education: A case study from Switzerland. *Nordic Journal of Digital Literacy, 14*(3-4), 147-163.

Breakstone, J., Smith, M., Wineburg, S., Rapaport, A., Carle, J., Garland, M., & Saavedra, A. (2019). *Students' civic online reasoning: A national portrait*. Stanford History Education Group & Gibson Consulting. https://purl.stanford.edu/gf151tb4868

Cherner, T. S., & Curry, K. (2019). Preparing pre-service teachers to teach media literacy: A response to "fake news". *Journal of Media Literacy Education, 11*(1), 1-31.

Ciampa, K. (2014). Learning in a mobile age: An investigation of student motivation. *Journal of Computer Assisted Learning*, *30*(1), 82–96.

Elliott, J. C. (2017). The evolution from traditional to online professional development: A review. *Journal of Digital Learning in Teacher Education, 33*(3), 114-125.

Erdem, C., & Erişti, B. (2022). Implementation and evaluation of a media literacy skills curriculum: An

action research study. *International Journal of Modern Education Studies, 6*(1), 20-50.

Gretter, S., & Yadav, A. (2018). What do preservice teachers think about teaching media literacy? An exploratory study using the theory of planned behavior. *Journal of Media Literacy Education, 10*(1), 104-123.

Growth Engineering (2022). *Just-in-time learning: 8 steps to success.* https://www.growthengineering.co.uk/what-is-just-in-time-learning/

Harvey, J., McNelly, T. A., Buxton, J. A. (2022). Toward a media literate world: Exploring secondary educators' challenges incorporating media literacy education. *Media Education Research Journal, 11*(2), 1-21.

Hsu, Y-Y., & Lin, C-H. (2020). Evaluating the effectiveness of a preservice teacher technology training module incorporating SQD strategies. *International Journal of Educational Technology in Higher Education, 17*(31),1-17.

Johnston, N. (2010). Is an online learning module an effective way to develop information literacy skills? *Australian Academic & Research Libraries, 41*(3), 207-218.

Kim, D. (2018). A framework for implementing OER-based lesson design activities for pre-service teachers. *International Review of Research in Open & Distance Learning*, *19*(4), 148–170.

Luo, T., Hibbard, L., Franklin, T., & Moore, D. (2017). Preparing teacher candidates for virtual field placements via an exposure to K-12 online teaching. *Journal of Information Technology Education: Research, 16*(1), 1-14.

Mahmoudi, S., Rastgar, A., & Imanifar, H. (2020). Investigating the harms and challenges of teaching media literacy in schools. *Society Culture Media, 8*(33), 83-100.

McGrew, S., Ortega, T., Breakstone, J., & Wineburg, S. (2017). *The challenge that's bigger than fake news: Civic reasoning in a social media environment*. American Federation of Teachers. https://www.aft.org/ae/fall2017/mcgrew_ortega_breakstone_wineburg

McAnulty, J. (2020). Preservice teachers' perceptions of teaching news media literacy. *Social Studies Research and Practice*, *15*(1), 97-113.

Media Literacy Now. (February, 2023). *U.S. media literacy policy report 2022*. https://medialiteracynow.org/wp-content/uploads/2023/02/MediaLiteracyPolicyReport2022.pdf

Media Literacy Now. (2020). *U.S. media literacy policy report 2020.* https://medialiteracynow.org/u-s-media-literacy-policy-report-2020/#

Meehan, J., Ray, B., Walker, A., Wells, S., & Schwarz, G. (2015). Media literacy in teacher education: A good fit across the curriculum. *Journal of Media Literacy Education 7*(2), 81 - 86.

National Association for Media Literacy Education. (n.d.). *Media literacy defined*. https://namle.net/resources/media-literacy-defined/

Rideout, V., Peebles, A., Mann, S., & Robb, M. B. (2022). *Common sense census: Media use by tweens and teens, 2021*. Common Sense Media. https://www.commonsensemedia.org/sites/default/files/research/report/8-18-census-integrated-report-final-web_0.pdf

Robb, M. B. (2017). *News and America's kids: How young people perceive and are impacted by the news.* Common Sense Media. https://www.commonsensemedia.org/research/news-and-americas-kids-how-young-people-perceive-and-are-impacted-by-the-news

Salomaa, S. Palsa, L. & Malinen, V. (2017). *Opettajaopiskelijat ja mediakasvatus 2017*. The Finnish National Audiovisual Institute. http://www.mediataitokoulu.fi/opettajaopiskelijat.pdf

Schmidt, H. C. (2013). Media literacy education from kindergarten to college: A comparison of how media literacy is addressed across the educational system. *Journal of Media Literacy Education, 5*(1), 295-309.

Scott, S. J. (2022). *Just-in-Time learning theory: Definition, origin & how to implement JITL.* Develop Good Habits. https://www.developgoodhabits.com/just-in-time-learning/

ScuteInicu, G., Tekula, R., Gordon, B., & Knepper, H. J. (2019). Consistency is key in online learning: Evaluating student and instructor perceptions of a collaborative online-course template. *Teaching Public Administration, 37*(3), 274-292.

Smith, M. G., & Schlaack, N. (2021). Teaching during a pandemic: Elementary candidates' experiences with engagement in distance education. *IAFOR Journal of Education: Technology in Education, 9*(4), 7-22.

Steeves, V. (2014). *Young Canadians in a wired world, phase III: Experts or amateurs? Gauging young Canadians' digital literacy skills*. Media Smarts. https://mediasmarts.ca/ycww/experts-or-amateurs-gauging-young-canadians-digital-literacy-skills

Tiede, J., Grafe, S., & Hobbs, R. (2015). Pedagogical media competencies of preservice teachers in Germany and the United States: Comparative analysis of theory/practice. *Peabody Journal of Education, 90(*4), 533-545.

Voss, B. (2022). Design principles for music technology education support: Just-in-time learning in the recording studio using mobile technologies. *Journal of Music, Technology & Education*, 14(1), 21–42.

Wineburg, S., McGrew, S., Breakstone, J., & Ortega, T. (2016). Evaluating information: The cornerstone of civic online reasoning. *Stanford Digital Repository*. http://purl.stanford.edu/fv751yt5934