

## RESEARCH ARTICLE

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# Elementary Education Teacher Candidates' Development of Lesson Planning Skills in an Online Instructional Design Course

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Universities continue to explore the presence and role of online courses in their educational programs. Colleges of Education are in the center of this effort as teacher educators and researchers explore whether or not teacher candidates can learn how to teach by taking online courses. This study examined both learning outcomes and teacher candidates' reactions to completing an asynchronous online course in an elementary education program focused on designing instruction and learning how to integrate technology into teaching. Analyses of variance indicated statistically significant gains across the three semesters that the course was offered. Further, inductive qualitative analyses of teacher candidates' reactions included primarily positive comments about the flexible nature of the course, the nature of feedback given, and the authenticity of assignments. Implications are shared for the future design and research of online teacher education courses.

*Keywords:* teacher education, lesson planning, instructional design, elementary education, online courses

## OVERVIEW

### Online Courses in Higher Education

Colleges and universities continue to look for innovative ways to teach their students. One such innovation has been online courses, which provide students with more flexibility to complete course work and allow them to engage more deeply with the content on their own time (HEFCE, 2011). Online courses are offered either synchronously or asynchronously. Synchronous courses have set times and days for online or virtual course meetings, while asynchronous courses do not have any set times for virtual course meetings (Ko & Rosen, 2010). The amount of online courses and programs at colleges and universities continues to increase, in addition to the number of students taking such courses (Allen & Seaman, 2013). However, one field that has been slow to pick up on online courses has been education, especially programs granting students with their initial teacher license. One common question in education is about whether

college students can be effectively prepared to teach through completing online courses or programs (Dowling & Dymont, 2013; Polly, 2013).

The research on online education indicates varied results on the impact of online courses and programs on learning outcomes (e.g., Allen & Seaman, 2013; Bernard, Abrami, & Lou, 2004; Bernard, Borokhovski, & Schmid, 2014; Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). Bernard et al. (2014) conducted a meta-analysis of courses with blended or online components and found that students in these courses significantly outperformed peers in traditional classroom courses. This was an extension of the study by Bernard et al. (2004) that found that there were no significant differences between online versus classroom-based courses, and that in some cases classroom-based courses were more effective and in other cases online courses were more effective.

Allen and Seaman's (2013) analysis of online education over the past ten years found that students in online courses perform as well or better than those in face-to-face courses. Previous studies on asynchronous online advanced mathematics education courses found that these experiences were associated with positive student learning outcomes (Polly, 2013, 2014, 2015). While these findings show a potential benefit of online courses, further research is needed on various types of courses with more of an intensive focus on attributes of courses (Dymont, Downing, & Budd, 2013; Polly, 2015).

### Effective Components of Online Education Courses

Various research studies have examined both instructors and students' perceptions and thoughts of effective online courses. Students have stated in research studies that they value online courses with meaningful, engaging activities (Heirdsfield, Walker, Tambyah, & Beutel, 2011; Kauffman, 2015), in which assignments are clearly laid out and expectations are transparent (Levin, Waddoups, Levin, & Buell, 2001). Further, students have reported that they value online courses with ample, high quality feedback on their progress and learning (Hodges & Cowan, 2012) and opportunities for students to reflect on their experiences (Dowling & Dymont, 2013).

Research studies have also examined the influence of instructor-learner interaction. Dennen (2007) found that consistent, ongoing interaction led to greater student satisfaction. Further, Ke and Xie (2009) found that student learning outcomes were higher when there was documented intensive interaction between learners and instructors in online courses. Allen and Seaman (2013) noted that students in online courses wanted to know that their instructors were actively engaged in their learning. Further, Heirdsfield et al. (2011) found that instructors felt that were not really teaching unless they were constantly interacting with students in online courses. The component of instructor involvement was also evident in studies that examined both asynchronous and synchronous course offerings. Offir, Lev, and Bezael (2008) found that student learning outcomes in an online course were dependent on the level of instructor involvement no matter what the format. Additionally, they found that only students who could independently demonstrate higher-level thinking skills were able to succeed in courses with very little instructor-student interaction.

## Teacher Education Courses Online

A majority of teacher education courses offered online are for advanced certificates and degrees and are taken primarily by current teachers in classrooms. While there is a growing number of online teacher education courses and programs for teacher candidates seeking their initial teaching license, these are less abundant than courses for current teachers (Dede et al., 2009; Polly, 2014). In this paper, we use the phrase teacher candidate to refer to those seeking their initial teaching license.

In the sparse number of studies that have been published about online teacher education courses for candidates seeking an initial license, results have been mixed. O'Connor (2011) studied the extent that elementary education candidates applied explicit teaching practices from an online course into their course projects. The findings indicated that while some projects indicated student understanding, candidates' videos lacked explicit evidence that candidates were able to apply the emphasized teaching practices. Schwartz (2012) found that elementary education candidates in an asynchronous online section of a course performed similarly to those in a face-to-face section of the same course, except that candidates in the online course reported a lack of opportunities to synthesize and learn tips for future teaching that they may have received in a face-to-face section of the course. An ongoing study of elementary education candidates' design of interdisciplinary units found that candidates in both face-to-face sections and an asynchronous online section successfully designed units that met the criteria of the course (Polly & Rock, accepted).

## Purpose and Research Questions

As universities look to add online courses and programs in teacher education that lead candidates towards teacher licensure there is a need for more research about both the evidence of and candidates' experiences in these types of courses. To that end, this study examines three iterations of an asynchronous online course taken by elementary education candidates. The following research questions guided this study:

1. To what extent were elementary education teacher candidates able to design effective lesson plans?
2. What did elementary education teacher candidates' report of their experiences learning how to design lesson plans in an online course?

## METHODS

### Context and Participants

This study included data from 90 elementary education teacher candidates who completed the instructional design and technology integration course in one of the three semesters in which it was offered in a 100% online format between 2013 and 2015. Each participant (candidate) was an undergraduate at a large university in the southeastern United States. Candidates were either second semester sophomores or juniors in their first semester in the Elementary Education

program, which leads to a license from Kindergarten through Grade Six. The author was the instructor of all three courses. While candidates were different in each of the semesters, their demographics were similar (Table 1). Both candidates' overall Grade Point Average (GPA) and their GPA in the two introduction to education courses taken as freshmen or sophomores are included in Table 1.

TABLE 1  
Number of Participants

Semester	Number of Students	Average GPA	Average GPA in Two Education Courses
Spring, 2013	36 students	3.56	3.82
Fall, 2014	30 students	3.54	3.81
Spring, 2015	24 students	3.55	3.82

This study examined three iterations of the same course, *Instructional Design and Technology Integration for Elementary School Learners*. The course was redesigned in 2012 so that some sections could be offered in a 100% online asynchronous format. The course activities were projects, which included making products such as lesson plans, outlines of instructional units, and artifacts using Web 2.0 tools, including Prezi, wikis, websites, Animoto videos among others. The instructional design and lesson planning portions of the course occurred during the first 5 weeks of the course. Due to the significance of lesson planning skills for teacher candidates, the scores from these lesson plans were the primary learning outcome for this research study. During the course, participants learned how to create both a direct instruction and an indirect instruction lesson plan. Table 2 further describes the components of each lesson plan.

TABLE 2  
Parts of the Direct and Indirect Instruction Lesson Plans

	Direct Instruction	Indirect Instruction
<b>Opening</b>	Focus/Review: Teacher activates prior knowledge and prepares students for the lesson.	Engage: Teacher activates prior knowledge and prepares students for the lesson.
<b>Activity 1</b>	Teacher Input: Teacher provides content or activities for students to learn about the content.	Explore: Students explore content through an experiment, completing tasks, or another activity.
<b>Activity 2</b>	Guided Practice: Students practice with immediate guidance and feedback from the teacher.	Explain: Teacher facilitates a discussion with students and helps students to make sense of the concepts embedded in the Explore activity.
<b>Activity 3</b>	Independent Practice: Students practice and apply the concepts independently with minimal teacher support.	Elaborate: Students complete follow up activities to deepen their understanding of concepts.

The components and implementation of lesson planning had some consistencies and differences across the three semesters included in this study. In each of the three semesters, students completed a module unpacking content standards and working with the Revised Bloom's Taxonomy. Students then completed a module where they created a draft of an indirect instruction lesson plan using a step-by-step process. Students turned in their indirect lesson draft, received feedback, then revised their draft and turned in a final version. Feedback was given using the comment feature in Microsoft Word. The same process of submitting drafts, receiving feedback, and revising drafts was also completed for the direct instruction lesson plan.

Differences occurred in the modules in which each plan was introduced. During the Spring, 2013 semester candidates spent one module becoming familiar with each lesson plan format by learning about the various phases and planning activities to go in each phase. However, during the Fall 2014 semester candidates started each module by completing a series of activities that situated them as learners in an elementary school classroom. For the indirect instruction lesson plan, candidates completed a variety of Kindergarten mathematics activities and then saw an example about how those activities would be compiled into a lesson plan. Likewise, for the direct instruction lesson plan candidates completed a variety of Grade 4 social studies activities and then saw an example about how those plans would be compiled into a lesson plan. During the Fall, 2014 semester feedback on drafts was very general and focused on asking more questions and adding more details about the specific activities.

During the Spring, 2015 semester, candidates had the same experience as the Fall 2014 candidates, only the feedback was much more detailed and individualized with a focus on questions and activities, such as before, but with more examples in the feedback for students to modify and use in their lesson plans.

## Data Sources and Data Analysis

For question one, the primary data sources were teacher candidates' two lesson plans which were created during their course. In order to answer question one, the lesson plans were graded using the course rubric which is out of 25 points. The rubric had been developed by three professors who are experts in instructional design and had been refined after being used in a previous semester. The rubric had been assessed for face validity as instructors had aligned the rubric with research-based principles of instructional design. Reliability was addressed in this study as the author was the only person to evaluate student work and use the rubric.

The candidate outcomes for question one are the scores of the first draft and the final lesson plans for both the indirect and direct instruction lessons. Descriptive statistics were analyzed for each of the semesters of the study. Further, Analyses of Variances (ANOVA) were conducted using SPSS 20.0 (IBM, 2011) to examine differences between both drafts and final copies of lesson plans between each of the semesters. Tukey's HSD were also run as post-hoc tests to more closely examine the differences in learning outcomes between specific semesters.

For question two, the primary data sources were teacher candidates' end of course reflections. Question two was examined through inductive, thematic analysis. Excerpts from candidates' reflections were entered into a spreadsheet where they were coded during an open coding process. Once the raw data was coded, codes were organized and grouped into themes. Themes were then verified by reexamining the raw data. Themes and excerpts that are representative of the data are provided later in this paper.

## FINDINGS

### Question One: Candidates' Scores on Drafts and Final Versions of Lesson Plans

The descriptive statistics for each semester and the four outcome variables are in Table 3. Question one was examined using four separate one-way analyses of variance (ANOVA) tests, which examined differences between semesters on the scores of both draft versions and final versions of the direct and indirect lesson plans. There was a significant effect of semester on the indirect lesson plan draft scores,  $F(2,87) = 26.39$ ,  $p < 0.001$ , indirect lesson plan final scores,  $F(2,87) = 7.60$ ,  $p = 0.001$ , and direct lesson plan draft scores,  $F(2,87) = 8.60$ ,  $p < 0.001$ . There was not a significant effect of semester on the direct lesson plan final scores,  $F(2,87) = 2.03$ ,  $p = 0.137$ .

**TABLE 3**  
Mean and Standard Deviations for Outcome Variables

	Semester 1 (N=36)	Semester 2 (N=30)	Semester 3 (N=24)
Indirect Plan- Draft	17.03 (2.92)	20.33 (1.77)	20.88 (1.68)
Indirect Plan- Final	23.53 (0.91)	24.23 (0.63)	24.25 (0.99)
Direct Plan- Draft	20.94 (1.29)	21.90 (1.45)	22.25 (1.03)
Direct Plan- Final	23.97 (0.77)	24.30 (0.88)	24.33 (0.70)

Post-hoc tests using Tukey's HSD were conducted to more closely examine the relationships between semesters. The post-hoc tests indicated the following statistically significant differences ( $p < 0.05$ ) for both the draft and final versions of the indirect instruction lesson plan between Semesters 1 and 2 as well as Semesters 1 and 3. There was no statistically significant difference between Semesters 2 and 3 for either version of the indirect lesson plan. For the drafts of the direct instruction lesson plans, statistical significant differences once again were found between Semesters 1 and 2 as well as Semesters 1 and 3. For the final version of the direct instruction lesson plan, there were no statistically significant relationships between any of the three semesters.

### Question Two: Candidates' Report of Learning Lesson Planning in an Online Course

The analysis of data from candidates' reflections indicated three primary themes: instructor feedback, flexibility in completing work, and authenticity of assignments. These are described in more detail in this section.

*Instructor feedback.* Nearly every candidate (88, 97.78%) reported on their reflection comments about instructor feedback. Out of these 88 comments, 79 (89.78%) were positive and

were coded as feedback was beneficial. An example from a teacher candidate about the benefit of feedback was, “It was helpful during the lesson planning process to submit a draft, and get detailed feedback about how to make our lesson plans better.”

Another candidate wrote, “I know some of my classmates needed feedback and a chance to get specific guidance on how to improve our lesson plans. Receiving detailed feedback was key to my success in figuring out how to create plans.”

Another code prevalent among positive comments about feedback was the individualized attention given on the feedback. “It was great to get comments and suggestions that were specific to my own lesson plans. That was helpful to me to know exactly how to make my lesson plans more effective instead of general suggestions.”

However, 9 (10.22%) of the comments were not positive. The negative comments all included a comparison between online learning experiences compared to sitting in a class and being told what to do. One candidate mentioned, “While the feedback helped, I wanted more examples and someone to tell me exactly the step-by-step process of how to create a lesson plan. For an online course this format was o.k., but not my favorite.”

Another candidate wrote, “I would have much rather sat in class and be told what to do, instead of trying to figure a lot of it out and get instructor feedback.”

In summary, comments on feedback mainly focused on the benefit of feedback, but some students did use the opportunity to compare feedback in an online course to receiving specific instructions in a face-to-face course.

*Flexibility in completing work.* Out of the 90 participants, 89 (98.89%) wrote comments about the flexible nature in completing work in the 100% asynchronous course. There were 75 (84.27%) positive comments about the flexibility that candidates could complete the course assignments on their own time. These comments were very similar in nature and focused on the idea that candidates could fit course work when it was convenient for them. One candidate wrote, “As long as I was disciplined enough to set time aside, the online format was a huge benefit to me.”

This idea of planning and managing time was also a comment in the 25 students (28.09%) who made negative comments. There were 14 of these students who wrote only negative comments about flexibility, while 11 students wrote both positive and negative comments about the flexibility in the course. The negative comments all mentioned students’ need to establish structure and take the initiative to get assignments done. For example, one candidate wrote, “There were always multiple assignments due in each class so the flexible nature of the course made it hard to set a definite time aside each week to get projects done.”

Another candidate wrote:

“Being able to work whenever I wanted to was a blessing and a curse. I loved being able to work whenever I could on assignments. But it was definitely a challenge to manage my time and figure out when to get projects done.”

These negative comments related to flexibility focused on candidates’ challenge to manage their time and complete the work in the asynchronous online course. As stated earlier there were 75 candidates who made positive comments about the flexible nature of the course, and 25 candidates who had made negative comments that focused on candidates’ need to better structure their time and schedule.

*Authenticity of assignments.* Sixty-five (72.22%) of the 90 candidates wrote comments about the authenticity of assignments. Out of these 65 candidates, 59 (90.77%) wrote positive comments and focused on candidates' perceptions that the assignments were realistic and seemed to embody work of classroom teachers. One candidate wrote, "The work that I did in this online course were intensive projects, but they all seemed related to the actual work of teachers."

Another candidate made a connection between the authenticity of assignments and her motivation. "I was really interested and engaged in the course activities since they seemed similar to what teachers do. These projects helped me better understand what teachers actually do and reaffirmed that I am in the right major."

Six of the candidates' comments (9.23%) reflected a negative tone focused on the idea that the projects were difficult and time consuming. One candidate wrote, "I would have preferred to sit in class and have less of these projects to do. They were difficult and took up a lot of time to complete." This quote was representative of the six candidates who made negative comments.

## DISCUSSION AND IMPLICATIONS

A number of the findings in this study warrant further discussion and implications for future work. This section has been organized into two sections: influence of the course on candidates' performance and candidates' reactions to their experience.

### Influence of the Course on Candidates' Performance

Statistically significant differences were found between semester 1 and both semesters 2 and 3 for candidates' drafts and final lesson plans using the indirect instruction planning format and the draft of the direct instruction lesson plan. Semesters 2 and 3 both included a series of activities that situated candidates as elementary school learners that had to be done before they wrote the lesson plans. Based on the data, these activities may have contributed to candidates' increase in scores during semesters 2 and 3. Based on situated theories of learning (Bransford, Brown, & Cocking, 2000) and learner-centered approaches to instruction (APA Work Group, 1997; Polly & Hannafin, 2010), this finding supports these ideas that candidates are better prepared to design instruction and write lesson plans about activities if they have experienced the plans themselves (Polly & Hannafin, 2011).

There were no statistically significant differences between semesters 2 and 3 for any of the lesson plans. The difference between semester 2 and semester 3 was that the author provided more specific, individualized feedback on the rough drafts led to an increase in the mean score for each format and version of the lesson plan (Table 3), but the increase was not statistically significant. Prior studies have found that feedback and clear evaluation methods in online courses are important components (Dyment et al., 2013; Hodges & Cowan, 2012; Polly, 2014). In this present study, the addition of specific feedback on drafts would not influence the scores on the rough drafts of either lesson plan between semesters 2 and 3. However, the feedback may influence scores on the final versions of the lesson plans. While scores on the final projects were higher in semester 3, there was no statistically significant difference. The influence of feedback



in this study was evident, however. There was an increase in scores between the rough draft and final version of the indirect instruction lesson plan in semester one. The largest gain between draft and final versions occurred on the indirect lesson plan in semester one.

Lastly, the finding that the final versions of the direct instruction lesson plans were not statistically significant from one another is interesting and valuable to the field, as it was the second lesson plan written during the semester. This lack of a difference indicates that in spite of the activities prior to writing the draft and the type of feedback, all candidates ended up similar to each other on the scores of their final direct instruction lesson plan. One plausible instruction is that the direct instruction lesson plans were easier to write than the indirect plans, since they were more aligned to the types of lessons candidates have experienced during most of their careers as students.

Further research studies should be conducted in order to determine how other specific factors of activities in online courses influence candidates' learning outcomes. These may include follow-up studies about specific learning activities or the nature of feedback as well as examinations about how candidate-to-candidate interaction, how content is presented, or other factors that may be influential in candidates' learning outcomes. Further, as universities look to establish how much work should be required in an asynchronous online course and consider alternative models such as competency-based education, there is a need to examine the specific types and duration of learning experiences that are needed in order for learners to develop and independently apply specific knowledge and skills essential in a course or program.

## Candidates' Reactions to the Online Course

The data for research question two indicated that most of the candidates' reactions to the asynchronous online course were positive. Candidates' most positive comments focused on the instructor feedback and the authenticity of assignments. Candidates' comments on the flexibility of the course were mainly positive, but 25 students who wrote about flexibility made negative comments.

Out of the 90 students, 88 of the candidates wrote positive comments about the instructors' feedback, including the details provided as well as amount of support that candidates were given when they asked for support. This finding adds to the ever deepening literature base about the presence of the instructor in an online course, and the interaction between instructors and students in online courses (Hodges & Cowan, 2012; Kaufmann, 2015). The Community of Inquiry framework posits that teaching and instructor presence substantially influence students' performance and satisfaction in online courses (Garrison, 2007). Further, as indicated in the data for question one, instructor feedback also was associated with increases in candidate learning outcomes between the draft and final versions of their lesson plans. Subsequent studies should look at the nature of feedback. Contemporary technologies allow instructors to provide feedback via video or audio file as well as text. Research is needed to examine a few related issues. First, the Community of Inquiry framework (Garrison, 2007; Garrison, Anderson, & Archer, 2000), posit the importance of instructor or teaching presence. The findings from this study confirm that. However, to what extent does the instructor or teaching presence influence candidates' performance and experience compared to social presence and cognitive presence. Specifically, are these three aspects- teaching, cognitive, and social equally important?

Further, based on the influence of feedback on student performance future studies should examine whether the method of feedback influences both learners' perceptions of their course experience as well as their performance on assignments in which they receive feedback.

Candidates also reported a large percentage of positive comments on the authenticity of assignments. As this was candidates first semester in the elementary education program this finding is intuitive and supports research on engagement and motivation that learners will be more motivated if their work has relevance to them (Heirdsfield et al., 2011; Polly, 2010). Further, studies should more closely document students' motivation in online courses perhaps using interviews or survey methods, and examine any relationships between motivation and student performance. Since this study examined candidates' performance on lesson plans, one of the most authentic activities for teacher candidates, a high level of motivation was expected.

Lastly, while comments were largely positive, the highest number of negative comments was associated with the flexible nature of the course. A more detailed look at these comments indicated that the negative comments tended to include negative comments about candidates' struggle to manage their own time and structure their schedule in order to complete these assignments. This factor, though, also elicited many positive comments, as candidates reported enjoying the flexibility to complete course work on their own time whenever their schedule allowed. Flexibility is one of the main reasons that online courses have become popular, especially courses that are asynchronous (Allen & Seaman, 2013). For example, in an earlier study (Polly, 2014), candidates demonstrated the effective application of mathematics education concepts in an online asynchronous course when given feedback and major assignments were divided into smaller parts. While flexibility is an attribute of online learning to be valued and maintained, there is a need to look at possible types of structures and scaffolds that instructors could use and the effectiveness of those structures to allow for flexibility, while providing needed support for students.

## Limitations

This study was limited in that it examined teacher candidates' instructional plans but did not examine their enactment of the lesson in an actual classroom. Future research should include records of practice, such as classroom observations, videos of teaching, or other evidence to provide more information about teacher candidates' instruction and its alignment to the lesson plans and the rubric.

Further, the rubric that was used in this study was not evaluated for validity and reliability in great detail. The rubric was developed by experts at the university who have designed and consistently teach the course that was examined. While face validity was addressed through expert review, there should be more done to ensure that the rubric has validity and reliability.

## CONCLUSION

This study examined both elementary education candidates' learning outcomes and their reported experiences from an online asynchronous elementary education course. Statistically significant differences between the first semester and subsequent semesters were found on the draft and

final version of the indirect instructional plan, and on the draft version of the direct instruction lesson plan. These differences could be attributed to the addition of activities in the course that required candidates to complete elementary school experiences as learners before designing lesson plans on a related topic. Further, candidates reported primarily positive comments about the feedback they received from the instructor, the flexible nature of the course, and the authenticity of assignments. The only negative comments focused on the flexibility and students' struggle to establish structure to complete assignments.

There is a need for subsequent studies to further examine the influence of specific characteristics of online courses on learning outcomes and learners' perceptions and experiences. Further, there is a need to more closely study the methods and types of feedback and structure provided in order to further scaffold and support learners.

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