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EXAMINING PRE-SERVICE TEACHERS' PERCEPTIONS AND UNDERSTANDINGS OF VISUAL LITERACY INSTRUCTION

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Abstract

Despite the importance of promoting visual literacy in content instruction, there is scant research investigating pre-service teachers' perceptions and understandings of visual literacy instruction. To fill these research gaps, we developed a unit in a literacy methods course that integrated visual literacy and social studies instruction for pre-service teachers. In this qualitative study, we analyzed 65 elementary and secondary pre-service teachers' reflections after the unit. Findings revealed that a majority of pre-service teachers developed a positive attitude toward visual literacy (instruction), demonstrated better understanding of visual displays (ViDis) and visual literacy skills, and recognized the advantages of using ViDis for teaching and learning. Finally, we provided implications for teacher educators and future endeavors to promote more effective visual literacy instruction.

Recent research highlights that visual displays (ViDis) in K-12 social studies texts become increasingly complex as the grade levels ascend considering the density and variety of visuals and formatting features (Fingeret, 2012). Without explicit instruction, even skilled readers cannot naturally acquire and apply visual literacy skills when processing informational texts (e.g., learners may not be able

to extract relevant information from a flow diagram and rely heavily on verbal texts, McTigue & Flowers, 2011).

It should be noted that social studies demand our students to develop the competencies of critical thinking, inquiring and incorporating multimodal information (National Council of Social Studies, 2010). We argue that, if our young generation is going to be critical consumers of multimodal information, teachers must have a more nuanced understanding of visual literacy instruction, so that they can support students to foster skills of navigating and producing visual information (Roberts & Brugar, 2017).

Interestingly, when examining teachers' competency of developing effective visual literacy instruction in social studies, Brugar & Roberts (2017) found that even veteran elementary teachers need support to develop effective instructional strategies to align visual literacy instruction with Common Core State Standards (National Governors Association, 2010). This is very likely due to the fact that visual literacy instruction is rarely provided or emphasized in teacher education programs (Burgar, 2017). These findings call for empirical research to explore teachers' understanding of visual literacy and their competencies of developing effective visual literacy instruction.

Although the impact of visual literacy instruction on K-12 students' learning has been widely researched in the past few decades (Flynt et al., 2010; Miller 2016; Guo et al, 2020), there is scant research focused on teachers' instructional strategies in content areas. Specifically, within the context of social studies, it is less known if we prepare pre-service teachers with the knowledge and skills to deliver specific visual literacy instruction. To address these research gaps, we developed a unit aiming to facilitate pre-service teachers' understanding of visual literacy (instruction) in social studies in a literacy methods course. We then collected and analyzed their reflections after the unit. The primary focus of this study sought to explore pre-service teachers' perceptions and understandings of visual literacy (instruction) as well as their instructional needs after the unit.

Literature Review

Visual Literacy in Social Studies

The purpose of social studies is to prepare young children to be good citizens of a culturally diverse, democratic society (National Council of Social Studies, 2000). To achieve this goal, the National Council of Social Studies (2000) further suggested that K-8 social studies instruction should incorporate literacy skills including, but not limited to, reading, writing, listening, and communicating to engage students to better understand content. Especially in the 21st century, students

are more frequently exposed to a wide range of multimodal texts in social studies (Guo et al., 2018; Fingeret, 2012). To be critical consumers and active citizens, students should develop proficiency in interpreting, evaluating and navigating a wide range of multimodal sources.

Borrowing from previous research, we define visual literacy as the ability to decode, interpret, critique, and produce meaningful visual communications (Metros, 2008). It encompasses the skills to visualize and communicate internally, as well as ethically judge the accuracy, validity, and worth of ViDis in both print and digital format (Bramford, 2003; Metros, 2008). These visual literacy skills are essential in social studies texts, because students often encounter a variety of ViDis such as maps, tables, flow charts, timelines that require specialized literacy skills to process (Guo et al., 2018). For example, evaluating a context-specific map of World War II can be very different from organizing experiment data into a graph. Correspondingly, classroom teachers should be able to develop effective visual literacy instruction to equip students with these skills, depending on the subject matter. To achieve these goals, teachers should also have solid understandings of ViDis and develop proficiency in visual literacy.

Visual Literacy and Teacher Education

When examining teachers' instructional strategies of visual literacy, recent research revealed that elementary teachers rarely provided explicit visual literacy instruction to develop students' higher-order thinking in the content areas (Coleman et al., 2011; Brugar & Roberts, 2017). For example, in a self-reported survey study of visual literacy instruction, Coleman and colleagues (2011) revealed that 65% of the teachers reported that the most frequently used strategy was pointing to the ViDis in learning materials (Coleman et al., 2011). However, when asked whether elementary teachers used ViDis to guide children organize or create information, 30% of the respondents mentioned that they often had their students organize information from multiple sources and only 7% asked students to create a ViDi. These findings demonstrated that elementary teachers were less likely to utilize ViDis to their fullest potential in content areas.

One of the reasons why teachers did not provide explicit visual literacy instruction may be that teachers did not recognize their own visual literacy skills and their competencies of developing effective literacy instruction. As such, they were unlikely to transform such content knowledge into their instruction, and may have encountered challenges to explain ViDis to their students (Henderson, 1999). In fact, the Association of College and Research Libraries (2011) has established standards to promote visual literacy in higher education. For example,

it is suggested that visually literate learners should be able to “situate an image in its cultural, social, and historical contexts, and use images effectively for different purposes.” These standards provide a framework for educators to develop effective instruction in teacher education.

Although it is widely acknowledged that teacher education programs should emphasize visual literacy, the effectiveness of these programs needs to be investigated (Yeh, 2010). However, there is scant research conducted to explore pre-service teachers’ perceptions and understandings of visual literacy (instruction). Given the important role that future teachers play in promoting visual literacy, in our literacy methods class, we developed a unit to facilitate pre-service teachers’ understanding of visual literacy instruction. In the current study, we explored pre-service teachers’ perceptions and understandings of visual literacy (instruction) as well as their instructional needs after completing the unit.

Method

Overview of the Study

Participants were 65 pre-service teachers who enrolled in a teacher education program at a state university in the Northwestern area of the United States. At the time of data collection, they were enrolled in a literacy methods course, pursuing their initial teacher certification.

The current study is a part of our larger research project. To investigate pre-service teachers’ perceptions and understandings of visual literacy instruction, we developed a survey and two visual literacy assessments. Based on an initial analysis of their survey responses, we then developed an interactive unit to enhance their pedagogical content knowledge of visual literacy. Specifically, students read scholarly articles and attended one two-hour Zoom meeting. In this virtual workshop, we provided mini-lessons to introduce the most commonly used ViDis in social studies textbooks (Guo et al., 2018), essential visual literacy skills, and instructional strategies that promote higher-order thinking. By analyzing authentic examples, pre-service teachers discussed classroom applications in small groups. Finally, after the Zoom meeting, they developed a reflection paper based on four prompting questions provided.

Data Sources and Analysis

We provided four open-ended questions that guided pre-service teachers to reflect on (a) their perceptions of visual literacy (instruction) after experiencing the unit; (b) their major takeaways from this unit; (c) their thoughts on the advantages of visual literacy instruction; and (d) topics of visual literacy that they would like to

explore more. For the specific purpose of this study, we centralized our research on analyzing the data from their reflection papers because we were interested in exploring pre-service teachers' perceptions and understandings of visual literacy (instruction) after this unit, so that we could adjust our course and provide recommendations for future endeavors to strengthen teacher education programs.

We analyzed the pre-service teachers' reflective responses based on the following procedure. First, we imported their responses to each question by typing the phrases extracted from their narratives in an Excel spreadsheet. Next, we collaboratively examined the phrases to develop the initial coding schemes. Using the initial coding schemes, the first author analyzed the entire sample set as well as calculated the frequency of preservice teachers' responses within each theme. During the entire coding process, our team met regularly to refine our coding schemes by reorganizing and collapsing several initial coding categories. Findings were generated by examining the content of each theme in more depth.

Findings

Through a systematic analysis of 65 pre-service teachers' responses, we generated our findings in the following section aligning with the main prompt questions in their reflection papers: (a) their attitude toward visual literacy (instruction); (b) their thoughts on the advantages of visual literacy instruction; (c) their main takeaways; and (d) further exploration they would like to do. We discussed each section with examples.

Pre-Service Teachers' Attitude toward Visual Literacy (Instruction)

We identified three types of changes in their attitudes toward visual literacy after this unit: making positive and negative changes, and staying positive. Table 1 represents the frequency of responses regarding the change of preservice teachers' attitudes toward visual literacy (instruction).

TABLE 1
The Change of Pre-Service Teachers' Attitude toward Visual Literacy (Instruction)

Theme	Frequency of responses
Made positive change	51
Stayed positive	11
Made negative change	1

A majority of the pre-service teachers mentioned that they developed a positive attitude toward visual literacy (instruction). Specifically, they purported that they used to have a very limited understanding of visual literacy before this unit. For example, several pre-service teachers mentioned that “I am not able to define or describe what visual literacy is;” and, “I thought visuals are just photos/pictures.” These examples demonstrated that they were unfamiliar with visual literacy terminology. However, after this unit, they gained a deeper understanding of visual literacy. For example, one pre-service teacher wrote: “Visual literacy is more than simply understanding the information from the photos, it involves the ability to interpret the visual information critically using their own words.” Moreover, they also provide examples of different types of ViDis in their responses. For example, one pre-service teacher wrote: “Something new I learned from this unit is there are [sic] more than one type of maps, such as bird’s-eye view, flow map, and context map.”

Furthermore, with a deeper understanding of visual literacy, several pre-service teachers pointed out that they started to recognize the importance of teaching students visual literacy skills. For example, one pre-service teacher mentioned: “By learning the knowledge (e.g., definitions, features, design principles) of different formats of visuals, students will be able to interpret the visual information they are exposed to critically, instead of believing everything they see or interpret visuals just at a superficial level.” This pre-service teacher believed that teaching essential visual literacy skills would allow students to develop critical thinking by evaluating different sources of information.

In addition, several pre-service teachers mentioned that their attitude toward visual literacy did not change because they have appreciated the advantages of ViDis all along. From a learner’s perspective, they appreciated how ViDis improved their understanding of information. For example, one pre-service teacher mentioned: “The use of visual aids within literacy was the best supplemental aid to curriculum and always reinforced content for me.” From an educator’s perspective, they appreciated how ViDis would engage their students by pointing out: “My perception has not changed, it has only added a stronger support to my initial ideas of how visuals should be incorporated in schools to engage more students by providing fresh information.” Although these pre-service teachers seemed to hold the same perspective, this unit reinforced their beliefs about the advantages of incorporating ViDis into their classroom instruction.

Interestingly, despite the fact that nearly all pre-service teachers demonstrated a positive perspective toward visual literacy instruction, we found one pre-service teacher shared a somewhat negative perspective. He claimed that “Visual sources such as tables and flowcharts explain themselves perfectly, so

instructional activities are not necessary.” This example showed that this pre-service teacher did not recognize the value of visual literacy instruction because he believed that ViDis were self-explanatory so that students might not need additional instructional support.

Advantages of Visual Literacy (Instruction)

62 out of 65 pre-service teachers mentioned the advantages of ViDis and the importance of using visual literacy instruction from two angles: students’ learning, and teachers’ instruction. Table 2 summarizes the frequency of responses regarding the advantages of using visual literacy (instruction).

A majority of pre-service teachers emphasized that using ViDis allowed students to recall, comprehend, and think critically, which align with three levels of educational learning objectives from Bloom’s taxonomy: remembering, understanding, and analyzing. Specifically, several pre-service teachers believed that using ViDis allowed students to recall information. For example, one pre-service teacher wrote: “Providing students with visual aids is a helpful way to increase students’ memory about important concepts and events in any subject matter.” Moreover, beyond recalling, several pre-service teachers agreed that using ViDis would also facilitate students’ comprehension. For example, one pre-service teacher pointed out: “With the help of ViDis, students could dig deeper into a topic and visualize what might have happened during the event.” Finally, other pre-service teachers proposed that ViDis would help students develop critical thinking. An example selected from a pre-service teachers’ reflection may represent this perspective: “Visuals could help students see the content in a different way from texts, and in order to absorb the visual information, the students must think critically.” In summary, these pre-service teachers believed that using ViDis could benefit different levels of learning.

TABLE 2
Advantages of Visual Literacy Instruction

Theme	Sub-theme	Frequency of responses
Advantages for students’ learning (59)	enhance memory	14
	improve comprehension	21
	develop critical thinking	5
Advantages for teachers’ instruction	differentiating instruction	8
	making clarifications	5
	engaging students	2

Additionally, several pre-service teachers explained the advantages of providing visual literacy instruction from a teacher's perspective, involving differentiating instruction, making clarifications, and engaging students.

First, several pre-service teachers shared that ViDis would allow them to differentiate instructions by bringing more possibilities into classrooms. For example, "Visuals could help teachers to support different types of learners or learning styles;" and, "If there are visual learners and non-visual learners in the same classroom, ViDis could be crucial tools for visual learners and could serve as optional tools for non-visual learners."

Additionally, a few pre-service teachers agreed that ViDis would support them to better explain complex content. For example, one pre-service teacher wrote: "By offering a topographic map, students can quickly pick out the various rivers and mountains which blocked the way and then understood [sic] why the trek was extremely challenging." When the topics were complex and abstract, visuals presented more concrete information which is easier to understand.

Moreover, two pre-service teachers pointed out that using ViDis could engage students because ViDis can bring an element of excitement for students to look at something novelty instead of a block of text." This pre-service teacher surmised that ViDis better present information that catches students' attention, sparks their interests, and keeps them engaged.

In summary, these pre-service teachers agreed that using ViDis would not only allow students to better recall, understand and critique information, but would also help teachers to differentiate instruction for different types of learners, better explain information and engage their students.

Pre-Service Teachers' Main Takeaways

We found two common themes in pre-service teachers' main takeaways: pedagogical content knowledge of visual literacy instruction, and visual literacy instructional strategies. Table 3 presented detailed information regarding each theme.

TABLE 3
The Pre-service Teachers' Main Takeaways

Theme	Sub-theme	Frequency of responses
Pedagogical content knowledge		35
Instructional strategies	comprehension	17
	analysis	13
	creation	6

First, over half of pre-service teachers emphasized that they gained deeper pedagogical content knowledge about visual literacy instruction. The pedagogical content knowledge involves: (a) accuracy, for example, “teachers need to be aware of the message that the images are portraying and if the message is accurate”; (b) appropriateness, for example, “educators need to make sure that the visuals are used appropriately to that subject and that grade level”; and (c) purpose, for example, “visuals must be incorporated meaningfully with purpose and intention for what you want the students to get from the visual”. They demonstrated that visual literacy instruction should be taught intentionally in their classrooms.

Moreover, a majority of pre-service teachers shared a wide range of visual literacy instructional strategies, which demonstrated different levels of learning based on Bloom’s learning taxonomy (Anderson et al., 2001; Bloom et al., 1956). For example, to improve comprehension, a pre-service teacher mentioned that she would “show students comparison pictures before and after a historical event happened to help students understand the effects of that event more straightforwardly”. In addition to facilitating students’ reasoning and analysis, one pre-service teacher mentioned that she would “have students consider several prompt questions while looking at the historical photos in order to explain the reasons or effect of a historical event”. Finally, to foster creativity, several pre-service teachers proposed “hands-on activities” in visual literacy. For example, one mentioned that she would “facilitate students to make their own storyboards of a historical event or flowcharts of a geological formation”. Many pre-service teachers pointed out that “learning some instructional strategies for teaching visual literacy” was one of their greatest gains from this unit. These examples showed how pre-service teachers developed visual literacy strategies to address different learning targets.

Further Explorations

It also should be noted that several pre-service teachers still felt unprepared to teach visual literacy after this short unit. For example, one pre-service teacher wrote: “I still considered teaching visual literacy as a tough and challenging task.”

TABLE 4
Further Explorations for Visual Literacy Instruction

Theme	Frequency of responses
Explorations for universal instructional strategies	31
Explorations for a specific subject/group/resource	23

A few of them mentioned that they expected more courses about visual literacy (instruction) in teacher education programs to prepare them to teach visual literacy. Table 4 presents the frequency of pre-service teachers' responses regarding further explorations.

The majority of pre-service teachers expressed that they would like to further explore more instructional strategies. For example, one asked: "How [do] I use visual literacy to reach more learners?" Other participants clarified that there were some specific areas they wanted to explore further. For example, they were interested in teaching strategies for a particular group of students, such as students with visual impairments, or a particular subject such as ELA, as well as teaching tips for using a multimodal resource in class (e.g., a thinking map).

To sum up, after this unit, we found a majority of pre-service teachers developed a positive attitude toward visual literacy (instruction) as well as demonstrated a more in-depth understanding of visual literacy. Furthermore, they recognized the benefits of using ViDis for student learning, and were able to develop pedagogical content knowledge and instructional strategies in visual literacy. Finally, they also reported that they would like to further explore more specific instructional strategies.

Discussion and Implications

In this age of information, students encounter an increasing number of ViDis in content areas (Guo et al., 2018). As such, acquiring visual literacy skills allows our young generation to consume, critique, and produce information in a visual world (Brugar & Roberts, 2017; Coleman et al., 2018). Correspondingly, pre-service teachers should develop proficiency in visual literacy skills, as well as be prepared to provide effective visual literacy instruction in content areas. As such, we developed a virtual workshop to enhance pre-service teachers' understandings of visual literacy instruction and analyzed their reflection papers after the workshop. We summarized the major findings and discussed the implications as follows.

First, we found that prior to this unit, a majority of the pre-service teachers reported that they demonstrated a surface understanding of visual literacy, and were somewhat unprepared to teach visual literacy. After one intensive session, they gained a better understanding of visual literacy and different types of ViDis. Our findings are consistent with Farrell's study (2015), which revealed that without explicit instruction, pre-service teachers often demonstrated very surface understandings of visual literacy terminology (e.g., types and functions of ViDis) and its design principles (e.g., contrast, repetition, and alignment of

verbal and visual information). Therefore, these findings echoed Yeh and Cheng's (2010) suggestion that visual literacy should be included in teacher education programs to develop pre-service teachers' visual literacy knowledge and skills and facilitate their competence in teaching visual literacy. Researchers further recommended that teacher education programs should provide training on visual design principles including the use of color, font, and screen layout in instructional materials, so that pre-service teachers can develop their own instructional texts for different learning targets (Sosa, 2009; Yeh & Cheng, 2010).

Moreover, a majority of pre-service teachers recognized the advantages of using ViDis, as they mentioned that using ViDis would facilitate students' engagement, and help teachers to differentiate and clarify their instruction. These findings paralleled previous studies on K-12 students which revealed that using ViDis can generate children's learning interests (Williams, 2007) and allow teachers to use more concrete examples in content instruction (Lopatovska et al., 2016). For example, Williams (2007) found that primary-grade students were excited and intrigued when they were asked to create their personal stories using paintings. We believe that these alignments between our study and previous research, to some degree, support the notion that it is essential to provide explicit visual literacy instruction in K-12 classrooms to engage students and help them become visually illiterate.

Additionally, we found that a majority of pre-service teachers highly valued pedagogical content knowledge and instructional strategies of teaching visual literacy. Specifically, they reported that they would teach ViDis to facilitate students' comprehension and analysis of information; however, only a few of them mentioned that they would address higher-order thinking skills (e.g., create or produce new information). This finding is consistent with previous studies (Coleman et al., 2011), which revealed that elementary teachers were less frequently apt to utilize ViDis to the fullest potential in content areas, especially in helping students achieve the highest level of Bloom's taxonomy (e.g., apply knowledge in new situations and create new information). Based on these findings, we recommend teacher educators model how to use ViDis to facilitate learners' higher-order thinking. One way to achieve this learning target is using higher-order questions (Moodley, 2013). For example, when guiding secondary students how to process multimodal texts, teachers can facilitate students' reasoning skills by asking them to evaluate the presentation of the illustrations and design principles with sophisticated prompts (Moodley, 2013). Similarly, we recommend teacher educators to model how to develop clear, specific questions that can help learners to analyze, evaluate, and critique visual information, so that pre-service teachers can mimic effective instructions.

Finally, when asked to report what further exploration our pre-service teachers would like to do, a majority of them mentioned that they would seek for more visual literacy strategies to teach K-12 students. A few of them also reported that they still felt somewhat unprepared to develop effective visual literacy instruction. Interestingly, recent research (Brugar and Roberts; 2017) revealed that not only novice teachers felt unprepared to engage students with ViDis (i.e. maps, tables, timelines, captions), but veteran teachers also needed more instructional support to integrate visual literacy and social studies instruction in a meaningful way. For example, when observing a group of elementary teachers' classrooms, Brugar and Roberts (2017) noticed a veteran teacher rarely incorporated ViDis in social studies lessons, so they developed five intensive professional development sessions to support teachers to develop more effective visual literacy instruction. After completing the session, the veteran teacher could successfully help students make inferences by integrating ViDis and verbal text (captions).

Compared to Brugar and Roberts's (2017) study, it should be noted that we developed only one short session to facilitate pre-service teachers' understanding of ViDis and visual literacy instruction. Although a majority of pre-service teachers gained a better understanding of visual literacy instruction, their responses also indicated that one session of intensive instruction was not sufficient to cover all important topics of visual literacy. To improve our teacher education program and to promote visual literacy, we should offer more long-term, well-structured courses that integrate visual literacy and content instruction. For example, we could provide opportunities to support pre-service teachers to develop lesson plans that align with their teaching tasks in their field placement (Moodley, 2013), so that they will be able to teach visual literacy in an authentic context. Moreover, more studies are needed to explore how we can more effectively assess pre-service teachers' visual literacy knowledge and skills as well as their competency to develop instructional strategies, so that we can tailor our instruction based on their needs.

Conclusion

Considering the preponderance of visual information students may encounter nowadays, teachers should provide more intentional and explicit instruction of visual literacy. In our literacy methods class, we provided a one-session intensive workshop on visual literacy instruction to develop their visual literacy knowledge, skills as well as instructional practices. Findings revealed that a majority of pre-service teachers generated a positive attitude toward visual literacy instruction as

well as developed a deeper understanding of visual literacy instruction. However, several teacher candidates still felt somewhat unprepared to integrate visual literacy and content instruction into their own lesson planning. Future research is needed to further explore the instructional needs of pre-service teachers and in what ways teacher educators can better support them.

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