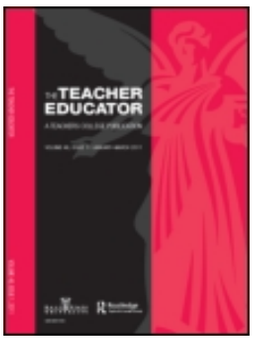

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PROMISING PRACTICE

ASSESSMENT360: A PROMISING ASSESSMENT TECHNIQUE FOR PRESERVICE TEACHER EDUCATION

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The call for preservice teachers to exercise reflective practices has echoed through U.S. education policy and research for a number of years and is evident in U.S. preservice teaching standards. As a result, educator preparation programs are challenged to design learning experiences and assessments that foster reflection skills. This study describes a promising assessment technique, named Assessment360, which can be implemented during coursework to prepare future teachers to be reflective practitioners. Assessment360 is a formative assessment technique in which students reflect on the content of a quiz individually and collaboratively in order to develop a deeper and more integrated understanding of the material. Thirty-one preservice education students enrolled in an undergraduate educational psychology course participated in this research. Results of the questionnaire suggested participation in Assessment360 potentially (a) fostered reflection, (b) encouraged peer interaction and learning (i.e., collaboration), and (c) promoted timely and frequent feedback. Implications and significance are discussed.

A goal of preservice teacher educator programs is to prepare educators who have the content knowledge and pedagogical skills to assure gains in P–12 student learning and performance (U.S. Department of Education [DOE], 2011). This expectation is articulated in state and national teaching standards (Council of Chief State School Officers, 2011; National Council for Accreditation of Teacher Education, 2010) and in U.S. national reform initiatives (e.g., No Child Left Behind, U.S. DOE, 2002). Underlying effective practice is the teacher's ability to engage in continuous reflection of his/her teaching and students' learning in order to come to deeper understandings that can be used to adapt instructional plans and practices (e.g., InTASC Standard 9). Reflection is important because it allows teachers to ''act in a deliberate and intentional fashion ... [to] convert action that is merely ... blind and impulsive into intelligent action'' (Dewey, 1933, p. 212). Despite the demand for reflective practitioners, many preservice teachers do not readily engage in high-quality reflective practice (King & Kitchener, 1994). As a response to this challenge, teacher educators use portfolio assessments during the fieldwork experience as one strategy to develop future teachers' reflective skills (Klecker, 2000). Additionally,

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however, there are potential opportunities for preservice teachers to gain proficiency in practicing reflective practices during coursework and thus begin fostering these skills earlier in their program trajectories. Therefore, the purpose of this article is to investigate a new, promising classroom assessment technique implemented during coursework to prepare future teachers to be reflective practitioners, named Assessment360. In the sections that follow, the theoretical basis for Assessment360 is outlined, the extant literature on reflection and formative assessment reviewed, the findings regarding its pedagogical benefits for a group of students in a preservice educational psychology class described, and implications discussed.

What is Assessment360?

Assessment360[1] is a formative assessment technique in which students reflect on the content of a quiz individually and collaboratively in order to develop a deeper and more integrative understanding of the material. This technique is named Assessment360 because it describes a process in which students engage in recursive iterations of analysis and feedback during assessment. Students analyze quiz items individually and collaboratively and receive feedback from their peers and the instructor at multiple points throughout the process. Because of the recursive nature of the process, there is the potential for students' understanding of the content to be continually refined until they have a ''360'' degree or ''holistic'' conceptualization of the material.

The instructor plays a pivotal role in Assessment360 including (a) establishing clear learning goals, (b) facilitating an open, judge-free learning zone, and (c) using assessment information to make instructional decisions. Articulating clear learning goals communicates the purpose(s) of Assessment360 and focuses students' attention on the various assessment tasks (Young & Kim, 2010) helping them to self-regulate and direct their own learning (Wiliam, 2007/2008). Second, because Assessment360 requires student involvement in collaborative and whole-class activities, students need to feel comfortable exposing their thoughts among peers and the instructor (Young & Kim, 2010). Steps must be taken to ensure a supportive environment as the development of a competitive environment and disruption of power relations among students can thwart performance (Cushing, Abbott, Lothian, Hall, & Westwood, 2011). The instructor can facilitate this process by creating an open, judge-free learning zone in which each student believes that his/her individual interpretations and experiences are valued, supported, and helpful to one another's learning (Wiliam, 2007/2008). Lastly, the results of student performance on an Assessment360 quiz can provide useful information on individual student misconceptions or class-wide gaps in knowledge that can serve as a guide for subsequent instruction. These data are used to determine the content of future lessons, assign students to collaborative groups, ascertain students' strengths and weaknesses, and differentiate instruction, all of which are positively correlated with student learning and achievement (Stiggins & Bridgeford, 1985; Young & Kim, 2010).

[1]Assessment360 should not be confused with ''360 degree assessments,'' which in the business literature refers to a series of performance evaluation instruments that are completed by co-workers at various levels within an organization (i.e., peers, direct supervisor, upper management, etc.). Assessment360 is an instructional technique for engaging in assessment, not a specific type of instrument.

Theoretical Framework

This research is grounded in a sociocultural model of learning based on Vygotsky's (1962) concept of internalization. Vygotsky suggested that thought manifests itself within socially mediated activities, and the purpose of inquiry is to examine how the learner internalizes processes learned in social activities (Palincsar & Herrenkohl, 2002). By interacting with more knowledgeable others (MKO), individuals are exposed to a number of social tools (e.g., cultural objects, language, and social institutions) and expert behavior that they then can internalize (Vygotsky, 1962).

Working with a MKO on joint activities provides opportunities for the expert to scaffold and co-regulate the learner as he/she practices new strategies and acquires knowledge. The term MKO includes adult models such as parents and teachers, as well as more advanced peers. Like adults, peers are able to scaffold learners' acquisition of knowledge and skills, and some learners who collaborate with a more able peer show the same advances in cognitive development as those that work with a teacher (Tudge, 1992). Sociocultural theories of peer learning assert that students can learn and acquire strategies as they work with a more expert peer on a common task (DiDonato, 2013; Järvelä & Järvenoja, 2007). Thus, it is not that knowledge or skill development is simply transferred to learners, but rather that learners are guided and participate in the process, rendering learning a social as well as individual activity (Rogoff, 1990). Finally, the theory posits that the learner will use strategies or knowledge internalized from the social activity to manage future tasks.

Review of the Literature

Assessment360 is a formative assessment technique. Despite more than 50 years of research in this area, it is clear from the literature that researchers still differ with regard to how to conceptualize and study formative assessment practices (Neesom, 2000) ranging from definitions based on purpose (e.g., to provide feedback, Wininger & Norman, 2005) to those based on its characteristics (e.g., timing and frequency of use, Young & Kim, 2010). In their seminal piece, Black and Wiliam (1998) advocated for a definition of formative assessment based on its purpose stating that formative assessment is ''all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged'' (p. 7). Thus, both informal and formal assessment instruments may be formative if the purpose is to provide feedback that informs instruction. In 2006, the Council of Chief State School Officers modified Black and Wiliam's conceptualization of formative assessment slightly to focus on the *process* (as opposed to activities) associated with providing feedback with the intention of improving instruction and student learning (Melmer, Burmaster, & James, 2008). Although Black and Wiliam defined formative assessment according to its purpose, other researchers have preferred to identify formative assessment by its characteristics (e.g., timing of the assessment). Chappuis and Stiggins (2002), for example, differentiated formative assessment from summative assessment claiming that the former serves the purpose of assessing learning in real-time, while the latter is intended to measure learning after instruction is complete. In 2006, Popham agreed that the timing of the assessment should be used to identify it as formative, however, in 2008 he adopted a conceptualization based on its purpose noting that formative assessment is a devised plan by which teachers

and students use assessment-based evidence to continuously alter instruction (Dunn & Mulvenon, 2009).

Thus, there appears to be some consensus that assessment instruments may differ (e.g., end-of-unit test, mid-unit homework assignment), however, all could be used for formative purposes. This point is best articulated in Black and Wiliam's (2009) more recent definition of formative assessment that stated ''a practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited'' (p. 9). Of notable significance in this conceptualization of formative assessment is that agents *use* (as opposed to solely collecting) evidence in good faith to *improve* student learning (even if the intended result is not always positive) and that instructional decisions based on evidence are more likely to positively affect performance, compared to those that were not. Furthermore, although formative assessment was once considered the sole responsibility of an instructor, more recent views highlight a student's active role in all aspects of formative assessment processes (Nicol & MacFarlane-Dick, 2006). In fact, Chappuis and Chappuis (2007/2008) argued that students can alter their own learning if assessment evidence is made known immediately by utilizing data and taking charge of their own development during instruction.

According to Torrance and Pryor (2001), teachers may approach the use of formative assessment in two ways. First, a teacher can find out *if* the learner has fulfilled the appropriate criteria. This is called the convergent approach. Alternatively, the teacher can determine *what* the learner understands, which is referred to as the divergent approach. Both aims are intended to elicit information from the learner that can be used to inform future instruction, however, the type, extent, and worth of the data may differ. Moreover, a teacher's approach to formative assessment can vary depending on if an assessment (a) occurs spontaneously (''on-the-fly'') based on ''teachable moments'' that arise during instruction, (b) is planned (''planned-for-interaction'') to gauge student understanding through questioning, or (c) is curriculum-embedded (designed to evaluate students' progress in relation to final unit goals) (Shavelson, 2003). Assessment360 is conceptualized as a convergent, curriculum-embedded formative assessment.

Independent Reflection

Dewey (1933) defined reflection as the ''active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends'' (p. 118). Reflection is typically initiated during states of confusion or perplexity. This prompts the learner to search for evidence to confirm or negate the learner's initial belief/understanding and results in a particular action. Dewey argued that it is the individual's impetus to act that distinguishes reflective practice from thinking back (Dewey, 1933) and (a) fosters connections (e.g., between ideas, relationships, experiences); (b) is systematic, intentional, and collaborative; and (c) intended as continuous improvement. Thus, reflection connects ''thoughts'' with ''actions'' (Driscoll, 1994). Schon (1983) differentiated between ''reflection in action'' and ''reflection on action.'' ''Reflection in action'' occurs *during* learning activities and describes problem solving and analysis processes that take place in real-time. In contrast, ''reflection on action'' refers to the conscious decision to look back at an identified problem, engage in analysis, and then determine a solution. During Assessment360, preservice teachers engage in ''reflection in action'' processes as they reflect on the assessment material in class.

Peer Reflection

Drawing on Piagetian theory (Piaget, 1950), peer interaction creates opportunities for disequilibrium or cognitive conflict arising from differing peer perspectives. Described by Ashman and Gillies (2013) as a ''trigger to social and cognitive change'' (p. 299), cognitive conflict can cause an individual to reflect on his/her current understanding and restructure his/her thinking, thus having the potential to lead to cognitive growth. Joint work on a common task exposes alternative ways of thinking, various perspectives, novel problem-solving strategies, and provides opportunities for students to learn from and reflect on each other's mistakes (Sadler, 1989).

Peer dialogue serves as a form of reflection in itself, allowing students to reflect on their own thinking as they explain course content and justify their decisions (Sadler, 1989). Students may better understand feedback when judgment is expressed in their *own language* because peers ''speak to each other in ways that can be understood easily, take feedback from each other seriously, and are strongly motivated to reconcile differences'' (Ashman & Gillies, 2013, p. 299). Furthermore, learners may be more likely to accept evaluation from peers because they are considered non-authoritative sources (Nicol & MacFarlane-Dick, 2006). As a result of peer reflection activities, researchers have noted increased self-assessment, self-monitoring, and self-regulation skills (Cartney, 2010; Evans, 2013; McDonald & Boud, 2003; Nicol, 2010; Rust, 2007) and have argued that peer reflection can lead to a shared understanding of the course content (Pailliotet, 1995). For example, research by Taras (2001, 2002, 2003) found that students who engaged in peer dialogue before conducting self-assessment were better able to identify mistakes versus those that received feedback after individual assessment.

Collaborative Assessment

Students can benefit from participating in collaborative assessment (Stahl, 2010). For example, Rao, Collins, and DiCarlo (2002) measured individual and group performance of 16 post-baccalaureate students at Wayne State University of Medicine. Students were taught four different topics in cardiovascular physiology and then completed a quiz individually (80% of grade) and collaboratively (two to three students; 20% of grade). Quizzes included various formats (e.g., fill-in-the-blank, multiple-choice, essay, and true/false). Results indicated that students performed better on all four quizzes when they engaged in collaborative assessment. Ioannou and Artino (2010) surveyed 31 students on their perceptions of collaborative assessment after completing a multiple-choice quiz in an educational psychology course. Questions were displayed on an overhead projector. Students were asked to individually record their answer to a question and then form self-selected groups of three to four members to discuss their individual responses. After one minute, students could select to record the group's response or to retain their individual response. Results indicated that students generally found the collaborative assessment experience less stressful, more enjoyable, and led to increased understanding compared to traditional, individual assessment. Hanshaw (2012) noted similar results when he surveyed 159 graduate students who engaged in collaborative assessment (groups were comprised of three to six members) twice over the course of a semester. Students reported enhanced learning, social interaction, critical thinking, listening and communication skills, and decreased test anxiety.

Purpose

Examination of the literature suggested that students benefited from engaging in formative assessment, individual and peer reflection, and collaborative assessment tasks. The present

study investigates students' perceptions of Assessment360, which is a promising classroom assessment technique implemented during coursework designed to include these task features. Specifically, we were guided by the following research question, ''What are students' perceptions of Assessment360 as a classroom assessment method?''

Method

Context

The setting for this study was a prerequisite undergraduate educational psychology course for preservice teacher education students at a large public university in the Northeast United States. The purpose of this course is to introduce students to the theory and research that underlies teaching practice, and students use a psychological lens to critically evaluate educational issues related to learning, development, instruction, motivation, and assessment. This course convened once a week for 15 weeks (approximately 3 hours per session). Students engaged in Assessment360 three times over the duration of the course and were assigned to new collaborative groups for each iteration.

Participants

Thirty-one students participated in this research, 12 male and 19 female. The majority of students were Caucasian ($n = 16$), nine were Hispanic, three were Asian American, one was African American, one was Native American, and one was Middle Eastern. Students ranged in age from 18 to 44 years old, however, the median age was 19. All of the students were undergraduates and the majority of students were in their sophomore year at this university.

Procedure

Prior to Assessment360

Students were introduced to Assessment360 (its purpose and process) during the first class session, and they were reminded of it during each class session prior to an Assessment360 iteration. During our second class, students participated in the TOWER activity to help prepare them to engage in collaborative work. For this activity, each group was given one piece of construction paper and a piece of scotch tape measuring one foot long. Their goal was to construct the tallest tower possible using all of their materials. Before students began using the materials, they had to develop and write down a plan for how they would construct their tower. They also had to identify three strategies for working cooperatively and use these when interacting with their group members. At the conclusion of the activity, students were asked to share which strategies worked and to identify areas for improvement. Thus, this activity was intended to help students practice team building and social skills strategies. During the fourth class period (the one before the first Assessment360 application), the instructor explained the importance of setting goals and the difference between content and process goals. Students were asked to identify one to two goals for each.

The planning process for Assessment360 also included constructing a quiz. The instructor used a Table of Specifications (DiDonato-Barnes, Fives, & Krause, 2013; Fives

& DiDonato-Barnes, 2013) to ensure alignment between instruction and the assessment. Quiz items were written to elicit higher order thinking processes to encourage students to engage in intense discussion and debate to defend their answer choices and reach agreement. The instructor also assigned students to groups of three to four students. For this iteration of Assessment360 (the first), students were assigned randomly; however, prior performance was used to determine group assignments on subsequent iterations.

During Assessment360

Students spent the first 45 minutes of class completing the quiz independently. Desks were separated into rows and a timer displayed on a PowerPoint slide. The instructor circulated the room to address any questions. After 45 minutes, individual responses were collected and group assignments were projected on a PowerPoint slide. Students used a seating chart on the blackboard to determine where in the classroom each group should sit, and they arranged tables and chairs into pods to facilitate group interaction. After spending a couple of minutes introducing themselves to each other, the instructor provided each group with a blank quiz and answer sheet. Each group had 20 minutes to complete the quiz collaboratively, and the instructor circulated around the room in case students had questions. After 20 minutes, the instructor collected the group quizzes. Next, the instructor displayed quiz items on the projector. Facilitated by the instructor, students engaged in a class-wide discussion of the quiz content and the instructor addressed any lingering misconceptions. Last, students spent 10 minutes reflecting on their content and process goals and establishing a few strategies to further future learning and performance while the instructor circled the room to address any questions and to provide feedback.

After Assessment360

The instructor graded the individual and group quizzes. Successful performance on the group quiz resulted in bonus points to each member's individual grade; there was no penalty for poor performance on the group quiz. For example, a score of 100% on the collaborative quiz added 4 points to each group member's individual quiz grade. A score of 90–99% on the collaborative quiz resulted in 3 points to each member's individual grade. Two points were added for a collaborative score of 80–89% and one point for a score between 70–79%. A score of less than 70% on the collaborative quiz neither increased nor decreased each member's individual score. When all scores were tallied and recorded into a spreadsheet, the instructor reviewed student performance to determine (1) students' strengths and weaknesses and (2) next steps with regard to instruction (e.g., re-teach, differentiated instruction, advance to next learning unit). (See Appendix A for a summary of the procedures.)

Data Sources

Students completed an open-ended questionnaire at the conclusion of the third iteration of participating in Assessment360. The second author (who was not the instructor for this class) administered the questionnaire. Participation was voluntary and students' responses were anonymous. The questionnaire was comprised of five questions, based on our theoretical framework and review of the literature. One question asked students for their general impressions of the assessment method, two questions referred to reflection, one question was intended to measure students' perceptions of Assessment360 as a formative

assessment method, and one question asked students to discuss the benefits of this method (Appendix B).

Data Analysis

Students' responses to the open-ended questions were coded with Nvivo software program for qualitative research in order to organize, cross-reference, and synthesize the data. Consistent with grounded theory methodology (Strauss & Corbin, 1998), we performed open coding, that is we both independently read 20% of student responses and ascribed subject categories to develop an initial set of codes. We met and discussed the codes that emerged from this level of analysis and applied this coding scheme to the next 20% of data. When new codes arose, then previously coded data was reviewed so that data was coded according to the most recent scheme. This process continued until we reached coding salience and no new codes were created. Then, we equally divided the remainder of the data to code according to the agreed on coding scheme. After all data was coded, another graduate student (who was not part of our research team) coded 20% of the transcripts in order to establish reliability, which was 84%. After discussion, agreement was reached on all codes. We used Nvivo to run reports by code to look for organizing and meaningful themes and to generate frequencies. When identifying themes we searched for negative instances of potential patterns or alternative explanations that could help interpret the data. In the following section we summarize the themes that emerged from the coded data.

Results

Three larger themes emerged from the data. Assessment360 potentially (a) fostered reflection, (b) encouraged peer interaction and learning (i.e., collaboration), and (c) promoted timely and frequent feedback.

Reflection

Students reported 82 instances in which Assessment360 encouraged them to reflect in a myriad of ways (Table 1). First, students' responded that Assessment360 provided them with multiple opportunities to reflect on the quiz content ($n = 19$). For example, one student commented, ''I liked that it gave you a chance to step away from the quiz and then come back to it with a clearer mind.'' Another student added, ''Because we went over the information many times, you really were able to absorb the information tested.'' Engaging in Assessment360 also encouraged students to reflect on their own knowledge ($n = 18$) and to think about how the information on the quiz connected to information learned in class ($n = 8$). As one student noted, ''Taking the quiz individually helped me to see how much I already knew,'' while another student added, ''We had to reflect on our class discussions, videos and activities.'' Reflecting on the content both individually and collaboratively challenged students and required them to think deeply about the material ($n = 18$) and led students to greater insights about themselves and the content ($n = 10$). For example, one student reported, ''I had to compare everyone's interpretations of questions and analyze them before deciding on the answer. This caused me to think deeper than I would otherwise have done.'' Two other students added, ''It made me rethink the answers I had already put on my quiz. This was challenging to me and the other students''

TABLE 1 Example and Frequency of Codes

Code	Example	*n*
	Reflection	
Multiple opportunities to revisit quiz content	''I liked that it gave you a chance to step away from the quiz and then come back to it with a clearer mind.''	19
Change in thinking or thinking about content more deeply	''I had to compare everyone's interpretations of questions and analyze them before deciding on the answer. This caused me to think deeper than I would otherwise have done.''	18
Think about one's own knowledge	''Taking the quiz individually helped me to see how much I already knew.''	18
Insight about oneself as a learner or course content	''It made me rethink the answers I had already put on my quiz. This was challenging to me and the other students'' and ''[reflecting] challenged me. Each time I took the quiz I gained more insight [into the material].''	10
Results in changes to thinking	''I realized I answered wrong a question on my individual quiz while I was taking the quiz with my group.''	9
Connects to previously learned material or out of class experiences	''We had to reflect on our class discussions, videos and activities.''	8
Total instances of references to reflection/Percent of total utterances: 82/34%		
	Collaboration	
Multiple perspectives	''Taking it [the quiz] with the group allowed me to hear about different answers to questions and the reasoning.''	29
Working with other students, group, together	''I really liked this method of having us work with each other.''	23
Discuss/Explain content to others	''It was a challenge but I had to explain why I thought an answer was correct to a question.''	16
Defend ideas	''If you think you know something but have doubt, you can't just guess on an answer. You have to try and reason it because you will have to defend your answer when you do the group quiz.''	16
Pooled ideas	''When we took the quiz as a group everyone was able to pool ideas which allowed us to look at the questions in a new light.''	5
Learn from others	''There were times I thought I was right, until another student explained it. For example, there was a question that I answered as collaborative work but the answer was actually inquiry. My group members helped change my view by describing why it was inquiry. I learned other people's reasoning behind why they chose different answers so it helped [me] see why I made a mistake.''	4
Total instances of references to collaboration/Percent of total utterances: 93/39%		

(Continued)

TABLE 1 *(Continued)*

Code	Example	*n*
	Feedback	
Specific explanations about performance	''I got thorough feedback as to what exactly I was wrong about or mistaken on.''	38
Information led to better understanding or improved test taking strategies	''This [method] is much more helpful [than traditional tests] because the information is fresh and I can change my thoughts right away. I left the quiz really feeling like I understood everything.''	19
Timing (immediate)	''It gave me a good idea of what I got wrong and explained why and also gives you your answer right away.''	9
Total instances of references to feedback/Percent of total utterances: 66/27%		

and ''[reflecting] challenged me. Each time I took the quiz I gained more insight [into the material].''

Collaboration

These preservice teachers reported that Assessment360 fostered collaboration ($n = 93$) by encouraging them to work together ($n = 23$). As one student noted, ''I really liked this method of having us work with each other.'' Working collaborative had a number of benefits. First, 29 students commented on how working collaboratively exposed them to multiple points of view, especially when each group member selected a different answer choice on his/her individual quiz. ''[Assessment360] made us evaluate the question deeper when we all had different answers.'' Another student added, ''Taking it [the quiz] with the group allowed me to hear about different answers to questions and the reasoning.'' Four students added that collaborating with their group members allowed them to learn from each other. As one student noted, ''There were times I thought I was right, until another student explained it. For example, there was a question that I answered as collaborative work but the answer was actually inquiry. My group members helped change my view by describing why it was inquiry. I learned other people's reasoning behind why they chose different answers so it helped [me] see why I made a mistake.''

Engaging in Assessment360 also encouraged students to explain their reasoning ($n = 16$) and defend their ideas ($n = 16$). For example, one student commented, ''If you think you know something, but have doubt, you can't just guess on an answer. You have to try and reason it because you will have to defend your answer when you do the group quiz'' while another student added, ''It was a challenge but I had to explain why I thought an answer was correct to a question.'' In this way, students became resources for one another by scaffolding and supporting each other as they pooled their collective knowledge to evaluate the merit of different answer choices (e.g., ''Within the group we could not decide between two answers and we were split down the middle. Together we broke down the problem, re-evaluated the wording, and came to a group conclusion''). Another student added, ''When we took the quiz as a group everyone was able to pool ideas which allowed us to look at the questions in a new light.''

Feedback

Students' comments suggested that they valued the feedback ($n = 66$) they received during Assessment360 because it provided specific explanations about their performance ($n = 38$). For example, one student noted, ''I got thorough feedback as to what exactly I was wrong about or mistaken on.'' Feedback was especially beneficial because it was immediate ($n = 9$). As one student commented, ''It gave me a good idea of what I got wrong and explained why and also gives you your answer right away.'' Students reported that receiving timely and specific feedback resulted in increased understanding of the course content. For instance, one student commented, ''This [method] is much more helpful [than traditional tests] because the information is fresh and I can change my thoughts right away. I left the quiz really feeling like I understood everything,'' and another student added, ''At the end of the test, we have gone over everything, so there are no outstanding questions or concerns before we move on.''

Discussion

The purpose of this qualitative study was to examine students' perceptions of a promising assessment technique, Assessment360. The results from the questionnaire suggested that students indicated Assessment360 potentially encouraged reflection, collaboration, and feedback.

Research suggests that reflection results in deeper, conceptual understanding of content; improved task strategies and argumentation skills; new perspectives; greater cognitive flexibility; and increased, sophisticated knowledge (Cooper, 1994; Driscoll, 1994; Hutchinson & Allen, 1997; Lin, Hong, Wang, & Lee, 2011; Rogers, 2001). In a study by Tien, Rickey, and Stacy (1999), for example, students in the experimental condition were asked to articulate a model of their current understanding of a chemical process and to reflect upon the implications of their observations on their conceptual model. Using a pretest and posttest design, results indicated that students in the experimental condition developed greater conceptual understanding than did those students in the traditional chemistry course (i.e., control group; no reflection activities). Furthermore, research by Brownlee (2001) investigated the effects of a year-long reflection development program in which 29 graduate students completed reflection journals on the content of an educational psychology unit in relation to their epistemological beliefs. Drawing on conceptual change research, which highlights the importance of reflection in altering incorrect beliefs, Brownlee found that students showed more growth in sophisticated epistemological beliefs, that is they were more likely to believe that truth is constructed based on evidence and reasoning rather than passively received and absolute. Thus, there is some initial support that Assessment360 potentially encourages students to reflect on course content at multiple levels (i.e., independent, collaborative). By engaging in ''multi-level analysis'' (Pailliotet, 1995), Assessment360 has the potential to help preservice teachers reconfigure and solidify their understanding of course content.

Students also indicated that participating in Assessment360 encouraged peer collaboration. Research dating back to the 1960s notes cognitive and social benefits to participating in collaborative learning groups (DiDonato, 2011; Gassem, 2003; Graham, 2002; Hsuing, 2012; Johnson & Johnson, 1989; Kapitanoff, 2009; Miller & Hamblin, 1963; Sharon, 1980). For example, Ebrahim (2012) assigned 163 female students in Kuwait to either a collabo-

rative learning or teacher-centered condition in a fifth grade science class and found that students in the collaborative learning condition had improved social skills and academic performance in comparison to students taught with the teacher-centered approach.

During collaboration students can act as instructional resources to one another, sharing knowledge and problem-solving processes by explaining and providing accompanying justification for ideas. Groups afford a context in which these explanations are made visible, in contrast to independent learning where they might otherwise remain internal and invisible to others (Webb, 1991). Group members can use explanations to describe or justify content-related information and problem-solving strategies in order to increase or clarify knowledge or understanding about the task. Importantly, providing explanations has benefits for both the person doing the explaining and other group members to whom the action is directed (Yackel, Cobb, & Wood, 1991) and can lead to increases in achievement, improved higher order thinking skills, and increased content knowledge (Hymel, Bowker, & Woody, 1993; Wentzel, 1994; Wentzel & Asher, 1995; Wentzel, Battle, & Looney, 2001; Yackel et al., 1991). Additionally, students learn respect for individual diversity (O'Donnell & Hmelo-Silver, 2013), appreciation for cultural values (McKeachie, 2002), and develop leadership and self-regulation skills (Bean, 2001; DiDonato, 2013) as a result of working in collaborative groups. Thus, there is some initial support that Assessment360 encourages students to engage in collaborative problem solving that can have benefits for individual learning and group performance.

Lastly, students felt that they received timely and specific feedback from participating in Assessment360. Other researchers have also found feedback to be more effective when it is specific (Brookhart, 2011; Hattie & Timperley, 2007; Kluger & DeNisi, 1996). Vague feedback is more likely to result in extraneous cognitive load (Shute, 2008), increased uncertainty (Thompson & Richardson, 2001), and decreased performance (Thompson, 1999). Moreover, feedback is more effective when the learner receives information in a timely manner; however, what is considered timely depends on characteristics of the learner, the task, and intended outcome (Shute, 2008). Brookhart (2011) noted timeliness (more than immediacy) is the integral aspect of feedback, stating that feedback should be given soon enough so that the learner still recalls the task being evaluated.

Students also noted that engaging in Assessment360 encouraged them to analyze their studying habits and develop better test taking strategies. Because students participate in Assessment360 three times over the course of the semester, feedback on early iterations served as information to the learner about sustained learning opportunities. In this way, feedback was ongoing and formative in nature, aimed to improve student learning and performance (Wiggins, 2012).

Limitations and Implications

The current study provides initial support for a promising classroom assessment technique, named Assessment360, implemented during an undergraduate educational psychology course, which can be used to prepare future teachers to be reflective practitioners, encourage peer interaction and learning (i.e., collaboration), and promote timely and frequent feedback. Despite these findings, there were undoubtedly constraints placed on the methodological procedures as a result of conducting classroom-based research. First, the sample size was limited to the number of students enrolled in this section of Educational Psychology. Future research with a larger sample size would help to substantiate these

claims. Second, the use of self-report measures always carries concerns regarding the validity of the measure and participants' understanding of the items. Although students were encouraged to ask questions if they needed clarification, in the future we intend to collect multiple measures of student data (e.g., quiz scores, interviews) in order to triangulate our findings.

Conclusion

Assessment360 is a promising formative assessment technique in which students in this Educational Psychology course reflected on the content of a quiz individually and collaboratively in order to foster a deeper and more integrative understanding of the material. Students' perceptions of these techniques were positive and suggested that Assessment360 encouraged them to reflect individually and collaboratively on course content, to work collaboratively with their peers, and resulted in immediate feedback on their performance. Assessment360 is a technique teacher educators can use to potentially help preservice teachers practice and hone these skills during coursework.

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Appendix A: Assessment360 Procedures

Prior to Assessment360

1. Explain purpose of Assessment360 and its process.
2. Design/implement learning activities to prepare students to engage in collaborative work including how to provide effective feedback.

3. Construct assessment using a Table of Specifications to ensure inclusion of items that promote higher order thinking.
4. Assign students to groups of 3–4 students. For the first iteration of Assessment360, students are assigned randomly. Prior performance is used to determine group assignments on subsequent iterations.
5. In class prior to Assessment360 have students discuss and set content and process goals.

During Assessment360

1. Classroom seating is arranged to reflect typical testing environment.
2. Students receive a copy of the quiz which they complete independently (45 minutes). A timer is displayed on a PowerPoint slide. Students are reminded to bring reading material (not related to the course) to use if they finish early.
3. Instructor circles the room to address any questions.
4. After 45 minutes, remaining quizzes are collected.
5. A PowerPoint slide displays group assignments and a diagram on the blackboard illustrates where each group sits. Students arrange tables and chairs into pods.
6. Each group receives one copy of the quiz and has 20 minutes to complete it collaboratively. Timer is displayed on a PowerPoint slide.
7. Instructor circles the room to address any questions.
8. After 20 minutes, quizzes are collected.
9. Instructor displays quiz items on projector. Facilitated by the instructor, students then engage in a class-wide discussion of the quiz content and the instructor addresses any lingering misconceptions.
10. Students spend 10 minutes reflecting on their individual performance and establishing a few strategies to further future learning and performance.
11. Instructor circles the room to address any questions and to provide feedback.

Subsequent to Assessment360

1. Instructor grades individual and group quizzes.
2. Successful performance on the group quiz results in bonus points to each member's individual grade; there is no penalty for poor performance on the group quiz.
3. The instructor reviews student performance to determine (a) students' strengths and weaknesses and (b) next steps with regard to instruction (e.g., re-teach, differentiated instruction, advance to next learning unit).

Appendix B: Assessment360 Questionnaire Items

1. In general, what did you think about this assessment method?
2. What were your impressions of (a) taking a quiz independently, (b) taking the quiz in groups, and then (c) discussing it as a class?
3. Describe an instance in which you had an incorrect answer on your individual quiz and then you changed your answer on the collaborative quiz.
4. In what ways did participating in Assessment360 challenge your thinking?
5. Describe an instance in which engaging in this assessment method encouraged you to reflect.