Challenges of Constructivist Teaching

Introduction

The desire to alter education arises from a dissatisfaction with student learning and, initiates reforms spurred by perceptions that schools are not meeting students’ intellectual and occupational needs. These reforms have led some educators to consider constructivism as an alternative to the traditional paradigm of teaching. The traditional classroom activity of transferring knowledge from teacher to student and rote learning is replaced with a student-centered approach that requires students to build knowledge from their own understanding and to create new meaningful knowledge.

However, constructivist teaching poses challenges of its own. Constructivist teaching contrasts with traditional teaching and may be difficult for some teachers to adopt. There are several possible problems that may contribute to teachers’ questioning whether to embrace a constructivist approach to teaching. I emphasize in this paper a few of the obstacles related to constructivist teaching.

First, time is a problem. Constructivist teaching requires role changes for the teacher and the student. Extra time is needed for all parties to learn and adjust to these roles, time for teachers to learn how to implement constructivist teaching in their classrooms, and time for students to master how to adapt to learning in a student-centered classroom. In addition, since individual students adapt to these changes at different rates, teachers need time respond to individual students’ constructions.

The second challenge is assessment of students’ work. The traditional written tests that provide standard criteria for evaluation may not be appropriate. In the
constructivist classroom, the teacher and student together decide whether the process and the results of the learning are reasonable. Furthermore, the assessment and the instruction are usually integrated. What standards are used to measure the learning? How does the teacher determine what knowledge is acquired?

Third, there is the challenge to the curriculum. Should its coverage of the content be broad or deep, or both? Teachers usually follow school district’s requirements of specific curriculum coverage for a school year. “However, in constructivist teaching, it is the students’ careful interpretation and deep understanding of the content and processes—in contrast to the ability to reproduce them---that is of concern” (Zahorik, 1995, P. 38). If one teaches for breadth to satisfy requirements, much of the curriculum is covered, but the richness of understanding the content may be shallow. If one teaches for depth, then time constraints may not allow for sufficient coverage of content. Yet, those who employ a constructivist classroom usually favor depth to allow students to make constructions and to increase students’ understanding of materials.

Although these are a few of possible challenges that warrant further discussion, there is one challenge that has piqued my interest and will be the focus of this paper. That is the challenge of determining what counts as reasonable or acceptable responses from students as they construct their own meaning. When do teachers decide to “tell” students the correct information as it has been constructed by experts and been accepted as formal knowledge? How do teachers find a balance between teacher involvement and noninvolvement as students construct meaning from new information? The role of facilitating students’ learning as they construct meaning contrasts significantly with the
traditional teacher’s role of transferring information from books and worksheets published by experts.

There is much indecisiveness as to how to apply the constructivist theory to classroom practice. Aireasian & Walsh (1997) suggest that constructivism is not an instructional approach, but a theory about how learners come to know. “Learning theories tend to be descriptive, theories of instruction, prescriptive; as a result, one cannot directly inform the other” (Prawat, 1992, p.360). With such indecisiveness, as teachers attempt to implement a constructivist teaching methodology and change from a traditional approach, they may find it difficult to negotiate how to balance teacher involvement and noninvolvement as their students construct meaning.

To probe the issue of teachers’ decisions of involvement and noninvolvement, this paper will explore the research of Magdalene Lampert, Deborah Ball, and Suzanne Wilson, who used their own practice as a site for studying teaching and learning. The case studies of their classrooms provide examples of constructivist teaching and the dilemmas they have encountered as they facilitate their student’s meaning-making. I will examine three cases of teaching and the dilemmas that were encountered as the teachers struggled with the decisions of student involvement and of the “telling” of formal knowledge to students.

First, I will begin with a description of constructivism and the dilemmas of deciding when to give students formal knowledge. Next, I will describe the research of Ball, Wilson, and Lampert as researcher-teachers. Ball teaches mathematics to a third grade class; Wilson teaches government to a third grade class; and Lampert also teaches mathematics, but to a class of fifth graders. Then, I will analyze and compare their
decisions of involvement or noninvolvement. Finally, I will discuss the implications for teachers who teach in constructivist classrooms.

Constructivist Theory and Dilemmas of Practice

In a constructivist classroom students build new knowledge by connecting new information to previously mastered knowledge in a process that involves problem solving within social contexts. The teacher is a co-learner who facilitates the students’ learning, providing opportunities to foster inquiry and risk-taking. Aireasian and Walsh (1997) suggest that the teacher must learn to guide, not tell, and that students must make their own meanings and not have them handed to them by the teacher. And the teacher must accept diverse constructions and not search for one “right” answer.

However, constructivist theory does not provide a method of constructivist teaching. Zahorik (1995) states that “[r]esearch and theory are helpful in identifying ways to teach. But teachers need to decide for themselves which techniques they will and will not use. When reduced to their essential character, these decisions deal with beliefs about students, their human qualities and learning processes, and with beliefs about knowledge, its form and function” (p. 33). Teachers may implement constructivist techniques, but decisions of how and when to intervene as students construct meanings are likely to vary. It may be difficult for some teachers to relinquish the authority of giving the correct answer when students construct answers that conflict with the wider community’s idea of a correct answer. Brooks and Brooks (1993) suggest it may be difficult because teachers do have the right answers that they want to share with students. Also some students would prefer the easier and faster route of obtaining the right answer from the teacher since teachers are considered the experts, rather than taking the time to
explore for the answer and developing their own constructions. However, sharing the correct answer may provide the student with the correct information, but may not encourage them to seek a deeper understanding of how or why the information is correct. Yet, as Zahorik (1997) observes, a teacher does not promote such understanding if he or she permits students’ constructions to stand uncriticized when they contradict expert constructions. Finding the balance between encouraging students to make meaning and knowing if and when to intervene with a right answer can be very difficult. Airasian and Walsh (1997) suggest that there should be a balance between the activities of constructing knowledge and receiving knowledge. The subject matter should not be taught all in the same way, such as solely all student-centered. I would suggest that this balance would include decisions of intervening with formal knowledge. Prawat (1992) also suggests that striking a balance between what one can realistically expect of the learner and what those within the discipline might regard as legitimate knowledge is difficult. He further suggests that this balance requires a sophisticated understanding of students and of the content they are being asked to learn.

Furthermore, Driver (1995) suggests that the intervention and negotiation is essential. The teachers’ role is a presenter of knowledge as well as to provide experiences in a constructivist view. Yet, Wood, Cobb, and Yackel (1995) propose that the resolution to the problem can have either of two results. The teacher’s role is either productive in which listening and probing the learners indirectly promotes their construction of conceptual operations. Or it is nonproductive in which the teacher is more directive in helping students avoid “blind alleys”.
Turning from these discussions of constructivist teaching, we can see how classroom teachers have researched these questions. Ball (1993) states that “respecting children’s thinking in mathematics does not mean ignoring nonstandard insights or unconventional ideas; neither must it mean correcting them. But, hearing those ideas is challenging” (p.385). This leads us to explore the research of Ball, Wilson, and Lampert. How did they deal with the challenges of balancing decisions in a constructive classroom?

Ball: The Case of “Sean’s Numbers”

Ball’s article, “With an Eye on the Mathematical Horizon: Dilemmas of Teaching” was published in The Elementary School Journal in 1993. It describes her interactions with third graders as she attempts to teach even and odd numbers, with the goal of integrating the concept of patterning and conjecturing about their generalizations into her lesson. Ball teaches the children that a number is even if you can divide it and not have halves. She illustrates with a diagram:

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One of the students, Sean, announces his discovery that the number six can be either odd or even. His rationale is that if you divide the number six into groups of two’s, you will have three groups of two’s which constitutes an odd number.

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Sean’s demonstration begins a debate among the students about the validity of his claims. One student refutes Sean’s claim and describes the groups of twos as even numbers, and offers further proof by stating and illustrating that odd numbers have groups of twos, but with one left over.

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Despite the overwhelming opposition of his classmates, Sean persists with his claim that some numbers could be both even and odd.

**The dilemma.** Ball was unsure of how to handle Sean’s thinking of even and odd numbers. She states that she often “must grapple with whether or not to validate nonstandard ideas” (Ball, p.387). However, Ball decides not to label Sean’s assertion that six is both even and odd as wrong. She explains to the children that Sean has invented numbers that we did not know before. She identifies them as “Sean’s Numbers”, which can be both odd and even. Ball describes Sean as pleased that his assertion is recognized and the other children as interested in the concept of Sean’s numbers. Many of the children search to find other numbers that fit the description of Sean’s numbers.

However, Ball worried that Sean’s numbers would confuse the children. Yet, she wanted her students to realize that they were capable of mathematical creations. Although Sean’s assertion that six was an odd as well as an even number was wrong, Ball justified her decision knowing that his assertion was the process of doing mathematics.

**Wilson: A Lesson in Government**

Ball and Wilson illustrates a lesson on government with Wilson’s third grade classroom in their article, “Integrity in Teaching: Recognizing the Fusion of the Moral and the Intellectual” in the American Educational Research Journal (Spring, 1996). In the article Wilson describes cases in the classroom that involved confusion of vocabulary meaning during discussions of government.

Wilson describes a lively discussion of possible sites for the Michigan capital. The children provide varying suggestions such as: in the middle of the state, near the ocean, near the seaside (people could go swimming and fishing after work and during their breaks), and one student suggests her backyard would be nice. Wilson points out that Detroit was the capital at one time and asks the students why they thought it was moved. Responses include: to prevent Indian attacks from Canada, a better location for car sales, and to make the location more equitable to all Michigan citizens. During the discussion, Wilson is constantly listening to the students’ ideas so she can examine what
they know and decide what issues to explore further. She contemplates how she will tie in their ideas with the concepts she wants them to learn about the capital. However, there is one response that troubles Wilson. Matt suggests that it would be beneficial not to have the capital in Detroit’s location because of hurricanes. If there were a hurricane, then the capital would fall into the water. Matt is thinking about capitols (buildings), not capitals (seats of government). Matt worries that the building would fall into the water. This confused interpretation of the word “capital” and its homonym “capitol” sets Wilson wondering if the other students understand that the discussion is about a government center and not a building.

Wilson reports another attempt to connect the students’ prior knowledge with new learning. She questions the students and listens carefully to their responses as she attempts to understand their thinking. Further into the government unit, the class begins a discussion of leadership. As the students speculate on the meaning of leadership, the discussion clearly reveals that many of the students parallel the meaning of leadership with that of ownership. The governor owns the state, the mayor owns the city, and the principal owns the school. Wilson states: “I felt like I was being sucked into a black hole of student understanding, a veritable whirlpool of misconceptions. Every time I looked for something that students knew that would help us move forward, I found out more about what they believed”(Ball & Wilson, p.161).

**The Dilemma.** Wilson describes her lesson’s purpose as having the students develop a sense of historical interpretations. As she listens to her students construct meanings for “capital” and “leadership”, she realizes the implications of allowing wrong interpretations to persist. While Wilson deliberates on how to address the wrong interpretations, she recognized a responsibility to her students. If she encourages students to answer and not offer the historians theories, she may restrict their opportunity to learn. However, if she presents only historians views of history, she may deprive her students of knowing that they are capable of constructing their own historical interpretations. Wilson’s dilemma was finding a balance of respecting her students’ thinking while also respecting history.
Lampert: Teaching About Knowing Mathematics

Lampert illustrates an example of a fifth grade math class learning about exponents in her article “When the Problem Is Not the Question and the Solution is Not the Answer: Mathematical Knowing and Teaching” in the *American Educational Research Journal* (Spring, 1990). Lampert describes the lesson as the operation of exponentiation, which involves writing numbers as powers of other numbers and comparing their orders of magnitude. During the lesson, the class discusses the legitimate ways to mathematically figure out the last digit of a number by looking at the exponent. The students observe patterns of the last digits of numbers when using exponents. They attempt to generalize to other numbers and to make their own assertions about patterns of last digits.

One student, Arthur, suggests that the last digit of 7 to the fifth power would be a one. A class debate results with several classmates disagreeing with Arthur’s assertion. Lampert states that she assumes the role of manager during the discussion. Sometimes she participates and refutes a student’s position. Arthur computes his answer by
multiplying $7^4 \times 7^4$. Several students dispute Arthur’s answer, but he continues to defend his position during the discussion.

The Dilemma. Lampert states that although she wants her students to know why mathematical rules work, she also wants them to experience the process of mathematics. Lampert proposes that if a teacher only demonstrates the information, the students would get a limited picture of mathematical expertise. Lampert states, “I purposely didn’t ratify any of the student’s assertions about the answer to $7^5$, or their arguments for their various positions” (p.52). She compares the teacher’s role to that of a dance instructor. She suggests that the teacher’s role requires some telling, some showing and some doing it with them along with regular rehearsals. Although Lampert did not “tell” in this example, she does admit that it is necessary at times.

“Sometimes, I straightforwardly told students what kinds of activities were and were not appropriate. At other times, I modeled the roles that I wanted them to be able to take in relation to themselves and one another. And at other times, I did mathematics with them, just as a dance instructor dances with a learner so that the learner will know what it feels like to be interacting with someone who knows how to do what he or she is trying to learn how to do” (p. 42)

Lampert wanted her students to know that they were capable of using a mathematical form of argument to legitimize or challenge another’s assertion.

The Decision to Tell or Not to Tell

The classroom cases of Ball, Lampert, and Wilson all clearly describe the dilemma the teachers faced as they confronted their students’ misconceptions. However, each of the teachers responds differently to her problem.

In Ball’s case, she decides not to tell Sean that he is wrong. She more or less “straddles the line” by creating another category titled “Sean’s Numbers.” Her decision conveys to Sean that his assertion is valued. However, in another case, Ball (Ball & Wilson, p.171) does tell the children that an assertion is wrong. There were only two days left of school and she didn’t want the children to leave for summer vacation with wrong information. However, the children did not readily accept Ball’s “expert”
information. Even though Ball gave alternative examples and an intense discussion of the answer to the problem, later when she checked the students’ notebooks there were still a variety of answers. It appears that deciding when to tell is complex. It may depend on the moment, the setting, the situation, the assertion, the children, the time allotment as well as other factors. Ball’s decision to tell varied.

Wilson does not disclose whether she tells or not. However, as the students make various assertions, Wilson describes that she listens carefully as she constructs how to redirect their assertions so that they can obtain the formal information. She stresses the importance of allowing the children the confidence to interpret history. Yet, Wilson clearly describes anxiety as she contemplates the implications of intervening or not with the children’s constructions.

Lampert does not tell, but skillfully redirects the students’ thinking with mathematical representations or examples. She questions her students while they make constructions so they may validate their own thinking. However, Lampert admits that she tells on occasions.

Each of the teacher’s decisions to tell varied in different ways. There appeared to be anxiety or concern in keeping the balance. However, each of the teachers felt it important not only to correct the dilemma of the students’ misconceptions of information, but also to do so in such a way that the children still felt capable. Ball wanted her students to feel capable of mathematical creations, Wilson wanted her students to feel capable of interpreting history, and Lampert wanted her students to feel capability of using a mathematical form of argument. Whatever their decisions were, it appears they based them on the premise that students should feel capable and confident to make assertions about knowledge.

The Implications

As mentioned earlier, it is difficult for some teachers to decide when to “tell” or not to give formal information to students who construct ideas that are not validated by the wider community. There appears to be no easy solution as to whether or when to make such decisions. One of the reasons is that teaching is quite ambiguous. Unlike
other professions, there are no unified standards that teachers may employ to perform their jobs. Often there are no right or wrong answers. Furthermore, the uncertainty may continue well after class has been dismissed. Teachers may debate with themselves weeks, months, or even years later as to whether or not a different approach to solve a problem would have been better. Whether in a traditional or constructivist classroom, teachers must make numerous decisions continuously throughout the day. However, deciding when to tell, when to intervene, or what counts as a reasonable answer are among the decisions emphasized in a constructivist classroom. And the research of Ball, Ball & Wilson, and Lampert has shown that although it may be difficult, it is not impossible.

Yet, teaching to make these decisions in a constructivist classroom is a complex endeavor. Nonetheless, many skills and factors may inherently lead to teachers becoming more intuitive and effective in their decisions of whether or not to intervene in students’ constructions of knowledge. Lampert (1986) suggests that “because no rules can specify how to manage and balance among competing concerns, teachers must be able to consider multiple perspectives and arguments and to make specific and justifiable decisions about what to do” (as cited in Ball, 1993, p. 395). Although there are no specific rules, researchers such as Ball, Lampert, Wilson, Zahorik, Wood, Cobb, Yackel, and others have given much thought to providing suggestions that may assist teachers who wish to employ a constructivist approach to teaching. To name a few, they offer: listening to students, asking questions, and offering suggestions that require students to give a more detailed response to facilitate the students’ construction of ideas (Wood, Cobb, & Yackel, 1995; Ball & Wilson, 1996; Lampert, 1990). Using these suggestions as a guide, I have constructed my own assessment of these recommended actions. I will attempt to expound on these and other suggestions and consider how they might lead to a productive constructivist classroom and the implications they will have for teachers. I will begin with teachers’ beliefs.

First, teachers will need to change their beliefs of how teachers teach. The teachers’ traditional role is to provide students with the correct answers. Teachers like students to have the right answers. In addition they want students to understand the materials being taught. It may be difficult, therefore to refrain from giving answers to
students and to allow them to make their own constructions. It is likely that some teachers will even inadvertently give information to students to lead them toward the correct information, and mistakenly think that the students’ constructions have led them to an answer when in fact it is the teacher’s presentation of information that pointed the way. Teachers should be aware of their potential traditional bias and be willing to change to implement a constructivist approach to teaching.

Second, teachers may need to become more knowledgeable about subject matter if they are to realize the advantages of teaching in a constructivist style. It is likely that culture, race, class, and gender backgrounds of students influence the constructions they make, and a successful constructivist teacher will have to take these factors into account. In addition, students will have varied life experiences that also affect their constructions. In a classroom, there may be as many different constructions of a concept as there are students. I would suggest that teachers who know their subject matter in depth are more likely to understand students’ constructions. They may also be better prepared to provide questions that direct learning. In addition, as teachers listen to students, it may also provide the knowledge needed to understand the rationale behind erroneous student assertions. These skills are more likely to enable a teacher to view student constructions from a different position and possibly to redirect the student with questioning using alternative models.

Third, listening to students also provides them with a voice. Teachers will need to recognize that students now have an active part in their learning. Constructive classrooms provide students with the opportunity to collaboratively decide the process of learning and to judge if the results of learning are reasonable. Teachers must provide a non-threatening environment so students will feel comfortable asserting answers. Wrong answers must be respected, yet challenged and redirected to the right information. Listening to students sends the message that their opinion counts and that they are capable of making valued assertions.

Fourth, The teacher must respect students’ thinking and ideas. This means taking their assertions seriously. It does not necessarily mean blindly accepting any answer as legitimate. Teachers should find a balance that allows students’ constructions to be valued as they make meaning of new information.
Fifth, teachers will need patience. It takes time to acquire the skills needed to teach in a constructivist setting. As in traditional classrooms, it is likely that teachers will gain valuable insights over time as they implement a constructivist approach to teaching and reflect on possible ways to improve their methods. Woods, Cobb, and Yackel (1995) give an example of a teacher’s attempt to execute a constructivist approach to teaching and the improvement that occurred with implementation over the course of a school year. In addition, most teachers are changing from a traditional approach that contrasts with constructivism, and therefore may need time to change long-standing beliefs as they adjust their teaching methods.

On a final note, teachers will need to be reflective. Teaching is a complex endeavor. I suggest that understanding self, students, teaching methods, and the application of theories is significant as teachers strive toward effective teaching. Reflection on classroom activities may provide assistance to teachers as they struggle with daily issues and concerns related to student learning.

These suggestions are not meant to give specific guidelines for deciding when to intervene or not to intervene as students construct meanings. I would propose that there is no such exact method. However, I would suggest that they might assist teachers as they attempt to implement a constructivist approach to teaching. Finding the balance between the activities of student construction and the teacher’s distribution of formal information is difficult. As teachers practice implementing a constructivist teaching approach, I expect that the struggle for balance will never cease, but hopefully will be more rewarding.

Conclusion

It appears keeping the balance between the activities of students’ construction and the teacher’s decision of when and if to give formal information is very complex. There is no model or guideline. I submit that there is no right or wrong answer. Teachers are most likely to make the decision in a split second as a dilemma arises. However, as teachers become more proficient in conducting a constructivist classroom, it is probable that their judgements to “tell” will decrease.
Researcher/teachers such as Ball, Lampert, Wilson, and others provide suggestions from their research on their own constructivist classrooms that may be helpful to teachers striving to become more proficient in using a constructivist approach. Their suggestions do not give definitive answers and are not meant to do so. However, their suggestions provide a means to improve constructivist-teaching skills and better prepare teachers for those indecisive moments. Yet, it is likely that many teachers will need to do as I did, and construct their own meanings from the information. As with the students, there may be as many different constructions of a situation as there are teachers. In addition, the same teacher may construct a different meaning for a similar situation depending on the circumstances.

How does a teacher balance between the activities of students’ construction and her decisions of when and if to give formal information? I assume as a reader of this document that you will construct your own ideas about the most effective approach to answering this question.

References


