The Importance of Reflective Thinking Skills for Physics Teachers

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Abstract

Physics is one of the most fundamental natural sciences that many researchers try to find ways to support students' learning. Reflective thinking as a popular term in teacher education is a mode of thinking which would be used during the education process. The purpose of the present paper is to identify the importance of five reflective thinking skills namely observation, communication, team working, judgment, and decision making skills for physics teachers. To achieve this goal the definition of reflective thinking from different approaches and different levels of teachers' reflective thinking are put forward.

Keywords: Physics teacher; reflective thinking; reflective thinking levels; reflective thinking skills

INTRODUCTION

For the past two decades, research on physics education has demonstrated that many students face severe difficulties in learning physics. Previous studies have shown that the understanding of how students attribute his or her failure and inability to perform well in science subjects will be helpful for teachers when trying to motivate their students.[1-2, 3] In those studies, students do become demotivated and lose interest in a subject when they attribute poor (science) performance to internal locus of control when in fact the source of difficulty is elsewhere. Educational reform promotes learning environments that encourage meaningful learning rather than rote learning and create a different view of teaching and learning that are the ways of supporting learning and teaching. One of these reform efforts is to develop teachers who are reflective about teaching and learning.[4]

REFLECTIVE THINKING

Dewey was the first to introduce the concept of reflection; he considered it to be an active and deliberative cognitive process that involves sequences of interconnected ideas that take into account underlying beliefs and knowledge.[5-6] Dewey started the premise that teachers should be encouraged to become thoughtful and alert students of education, and argued that teachers should continue to grow in reflection.[7]Dewey thought the idea of reflection can be equated to the force scientific inquiry: how to identify problems, systematic, thinking disciplined and create meaning as a result of past experiences.

According to Dewey, [5]reflective thinking is identified as a key to trigger the process reasoning, reflect and anticipate the questions the direction of a teacher and a successful science student. In fact, reflective thinking is the process of recalling an event in the mind and gives it serious and thorough consideration of these events.

Schönexpanded upon Dewey's notion of reflection.[8-9] He suggested that professionals should frame and reframe the complex problems that they face, and modify their actions accordingly. He argued that the truly reflective practitioner must augment technical expertise with personal insights and artistry and referred to professional artistry as "the kinds of competence that practitioners sometimes display in unique, uncertain and conflicted situations of practice".[9]

Schön introduced the concepts of reflection-on-action and reflection-in-action. Reflection-on-action implies looking back upon action sometime after it has taken place. Reflection during the teaching sessions carried out is the "reflection-in-action".[8]The term is often used to describe spontaneous behaviour and is correlated with expressions such as "thinking on your feet" and is being adapted to suit the situation and respond accordingly. It occurs when the interaction of students with current teachers in the classroom. While the reflection after the lesson called "reflection-on-action", reflection done to reflect the actions that have been implemented. The aim was to determine whether the plans have been made during reflection before action is able to produce the desired results or otherwise.

Calderhead and Gates assert that reflective teaching is a very critical element in professional development.[10] Reflective teaching is an approach to improve or enhance the education system through the changes that encourage teachers to become more aware of their teaching performance, and be critical of their teaching practices and are willing to change him in order to streamline and improve teacher performance as being excellent teachers. In fact, consciously or unconsciously many teachers have reflective teaching activities in teaching sessions. Reflective teaching can occur in three situations is before, during and after the teaching session conducted.

Smyth proposed four cycles in the process of reflective teaching: describing, informing, confronting, and reconstructing.[11] Describing asks the question "What do I do?" and attempts to elicit a simple observational description of practice. Informing addresses the question "What does this mean?" and looks to uncover the principles of theories-in-use. Confronting forces us to go beyond the classroom and asks "How did I become this way? "And finally, Reconstructing gives the call to action with "How might I do things differently? "These questions are intended to raise consciousness among educators, to challenge complacent attitudes and beliefs, and to engender a high degree of professional practice.

Based on the literature, the practice of reflection is necessary realized by the teachers in an effort to enhance the scholarship of teaching and learning is conducted. It is becoming more important among science teachers in developing inquiry forces students who need spark reflection and deep process of reasoning. The level of reflection plays an important role to identify the ways of supporting teachers' reflective thinking.

REFLECTIVE THINKING LEVELS

Scholars of reflective thinking have categorized it according to the mode of thinking or the process an individual progresses through to reach a level of reflection that complements both the context of the situation and the background the individual brings to the episode. One way of manifesting the characteristics of reflective thinking is through modes of delivery. Scholars differ on the hierarchical nature of reflective thinking but generally agree on three modes or levels: technical, contextual, and dialectical.[12-15] An initial level focused on teaching functions, actions or skills, generally considering teaching episodes as isolated events. A more advanced level considers the theory and rationale for current practice. A higher order is where teachers examine the ethical, social and political consequences of their teaching, grappling with the ultimate purposes of schooling. These studies have revealed that pre-service teachers and teachers can achieve the highest levels of reflection over time and if reflective exercises are present throughout their whole program especially during the field experience component by using reflective journals. Also the reflective thinking as a mode of thinking is developed with learning essays, concept maps, questioning, contractual learning and self-assessment activities.[16]

Investigation on teachers' reflective thinking allows us to act in deliberate and intentional ways, to devise new ways of teaching rather than being a slave to tradition, and to interpret new experiences from a fresh perspective.[17]In the reflective teaching, it is important to respect the opinions of the persons you communicate with; fulfil the responsibilities, consider the differences in education and measure the learning eagerness. It is aided with weekly observations and co-operation force the teacher research like the students and generates important concepts. Besides, the performance of the teacher is so important in the reflective teaching performance. By defining and analyzing these skills and practices, the success of the students increases in the course of the learning.[18] At this point, some set of tools gain importance for learning and teaching process and these are teacher journals, course records, observations and surveys, auditory and video records, observation and motion inquisition.[19]

Developing science and physics teachers' competencies that are comprised knowledge, attribute, and skills and specifically reflective thinking skills that are acquired through practice and experience in teacher education programs can foster teachers' reflective thinking.[20-21]

REFLECTIVE THINKING SKILLS

Today's need is to change the emphasis in teachers' initial education. Most programmes seek to strike a balance between subject matter knowledge, pedagogical knowledge and practice. But teachers today also need to develop the skills for reflective practice, research on the job and working in diverse environments.[22]

There are some examples of how professional development activities are being used to encourage on going informal learning in schools. A key strategy is to encourage teachers to become more inquiring, reflective practitioners, and to do so in collaboration with colleagues. As defined by Schon,[9] reflective practice involves thought fully considering one's own experiences in applying knowledge to practice while being coached by professionals in the discipline. Reflective practice encourages teachers to use personal histories, dialogue journals and small- and large-group discussions to reflect upon and improve their practice. The use of peer reflective groups and coaching encourages teachers to challenge existing theories and their own preconceived views of teaching while encouraging a collaborative style of professional development.[23]Licklider found that self-learning from experience in natural settings is an effective component of adult learning.[24] The research underlines a growing tendency to provide for activities such as study teams and peer coaching in which teachers continuously examine their assumptions and practices.

Dymoke and Harrison showed that the five core competent thoughts necessary for good practitioner are presented in turn: observation, communication, judgment, decision making, and team working.[21] Most of the studies focused on one or two skills of reflective thinking in their research. All five skills of reflective thinking are important professional skills and are applicable to all stages of teacher learning, including initial teacher education.[21]

The tools of observation skill take account of noticing teachers feeling and behaviours, and include noticing, marking and recording in order to distinguish something from its surrounding. Noticing involves recording brief but vivid details which allow teachers to recognise the situation for itself. There are various ways in which teachers

might do this: through writing, drawing, or video- and audio-recording, and even photography an artefact or product of teaching.[21]

Communication tools in relation to reflective practice can be developed in a variety of ways: through the keeping of a personal learning journal or diary, or through a more formal professional portfolio, supported by a system of formal tutorials with a mentor.[21] Since critical reflection on practice is an active and conscious process,[8, 25-26] teachers can start by asking their self a series of open questions about particular teaching episode or a critical incident within that episode, and jotting down their impressions using one of these ways of recording: What have I been doing? What am I doing? What has happened? What is happening? What led up to this? and why?

Injudgment skill,in order to analysis a classroom, event or situation, teachers should try to be absolutely clear what that event or situation consists of. If teachers, too, are involved in that event or situation then this view of the event needs to be impartial. Just describing what happens during the event can be problematic as well. Teachers might, rather skillfully, combine details of the event with their judgment, or with additional explanations and theories. As a judge, it is important to find the best idea and not wait for the perfect idea.[21]

Decision making has been defined as selecting a course of action to achieve a desired purpose. It is important to think about how teacher make sense of their learners and classrooms events.[21] In decision making skill, using different types of reflective practice strategies are important and they allow teachers to see, and cope better with, the complexities of teaching and teachers make decisions for further actions. In fact, reflective practice strategies help teachers to probe the strength and weakness of a lesson more deeply through dialog and critical reflection on practice.

Teacher will find themselves working in a number of teams from the start of their teaching career: their subject or curriculum team, their pastoral team and cross-curricular groups working on particular issues such as personalized learning and aspects of assessment, and so on.[21] Co-teaching, collaborative practitioner enquiry and action research are tools that prop team working skill of teachers.

CONCLUSION

The most important goal of this paper was to explore the importance of reflective thinking skills for physics teachers. Understanding reflective thinking skills and reflective thinking tools that request in each level of reflective thinking show how these reflective thinking skills can support teachers to improve their reflective thinking levels. To sum up, five reflective thinking skills of teachers as observation, communication, team working, judgment, and decision making can be applied by teachers based on some reflective thinking tools such as recording, writing, drawing, photography, learning journal, portfolio, lesson plan, co-teaching and collaborative practitioner enquiry in their classes. Therefore, physics teachers by applying reflective thinking skills in their classes can be improved their reflective thinking to work as a reflective thinker teacher.

REFERENCES

1. Weiner, B, 1979. A theory of motivation from some classroom experiences. Journal of Educational Psychology, 71, pp. 3-25.
2. Weiner, B, 1994. Integrating social and personal theories of achievement striving. Review of Educational Research, 64, pp. 557-573.
3. Hicks, R., and Nabilah Abdullah, 1998. Excellent vs. inordinate students. A Bureau of Research and Consultancy Research Report, Shah Alam: UniversitiTeknologi MARA.
4. Lowery, N. V, 2003. The fourth "R": Reflection. *The Mathematics Educator,* 13(2), pp. 23-31.
5. Dewey, J, 1933. How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process, Boston, MA: D.C., Heath and Company.
6. Hatton, N., and D. Smith, 1995. Reflection in teacher education: Towards definition and implementation. Teaching and Teacher Education, 11(1), pp. 33-49.
7. Dewey, J, 1910. The Influence on Darwin on Philosophy. NY: Henry Holt and Co.
8. Schön, D., 1991. The Reflexive Practitioner: how professional think in action.Aldershot, UK.:Ashgate.
9. Schön,D. A, 1996.Educating the reflective practitioner: Toward a new design for teaching and learning in the professions. San Francisco: Jossey-Bass, Inc.
10. Calderhead, J., and P. Gates, 1993. Conceptualising reflection in teacher development. Bristol, PA: Falmer.
11. Smyth, J, 1989. Developing and sustaining critical reflection in teacher education. Journal of Teacher Education, 40(2), pp. 2-9.
12. Van Manen, M, 1977. Linking ways of knowing within waysof being practical, Curriculum Inquiry, 6, pp. 205-228.
13. Zeichner, K and D. Liston, 1985. Varieties of discourse in supervisory conferences. Teaching and Teacher Education, no 1, pp 155-174
14. Lee, H.J, 2005. Understanding and assessing pre-service teachers' reflective thinking Teaching and Teacher Education, 21, pp. 699-715.

15. Muir, T., and K. Beswick, 2007. Stimulating reflection on practice: Using the supportive classroom reflection process. Mathematics Teacher Education and Development, 8, pp. 74-93.
16. Unver, G, 2003. Reflective Thinking, PegemA Publishing, Ankara.
17. Posner, G. J, 1985. Field Experience: A Guide to Reflective Teaching, *New York, Longman.*
18. Kronowitz, E, 1996. Your first year of teaching and beyond (2nd ed). White Plains, NY: Longman.
19. Gurol, A, 2010. Determining the reflective thinking skills of pre-service teachers in learning and teaching process, Energy Education Science and Technology Part B: Social and Educational Studies ,Volu.3(3), PP. 387-402.
20. Rosenberg, M., P. Sindelar., andM. Hardman, 2004. Preparing highly qualified teachers for students with emotional or behavioral disorders.*Behavioral Disorders*.29, 266.
21. Dymoke, S., and J. Harrison, 2008. Reflective Teaching and Learning, a guide to professional issues for beginning secondary teachers (1th ed.).
22. Duthilleul, Y, 2005. Developing teachers' knowledge and skills: Policy trends in OECD countries. Paris: UNESCO International Institute for Educational Planning.
23. Guiney, E, 2001. Coaching Isn't Just For Athletes: The Role of Teacher Leaders in *Phi Delta Kappan.* 82 (7), pp. 740-743.
24. Licklider, B.L, 1997. Breaking ranks: Changing the in-service institution. NASSP Bulletin, 81(Jan.), pp. 9-22. EJ 539 052.
25. Schön, D,1983. The Reflective Practitioner: How professionals think in action, NewYork: Basic Books.
26. Schön, D. A, 1987.Educating the reflective practitioner, SanFrancisco: Jossey-Bass.