CONSTRUCTIVIST APPROACH TO TEACHER EDUCATION: AN INTEGRATIVE MODEL FOR REFLECTIVE TEACHING

By

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ABSTRACT

The theory of constructivism states that learning is non-linear, recursive, continuous, complex and relational – Despite the difficulty of deducing constructivist pedagogy from constructivist theories, there are models and common elements to consider in planning new program. Reflective activities are a common feature of all the programs of constructivist Teacher Education .It is used at both Pre-service and In-service level of Teacher Education. Several studies have proved that, critical reflection upon experience continues to be an effective technique for professional development. The paper discussing the nature of constructivist approach to teacher education emphasizes the role of reflective activities in teacher training. Based on the results of the research reviews in the field of constructivist teacher education and reflective teaching, the findings of the study strongly suggests the integration of reflective teaching practice in the pre-service teacher education curriculum and suggests a proposed integrative model for reflective teaching. The study investigated the effects of different methods of teaching science on the achievement, basic science process and skills and scientific attitude of standard six pupils with different achievement levels. The study revealed that methods have differential effects on different contexts, that is, different pre-achievement levels. These differences were due to differences in the process variables. The study suggests that to implement any method, the context needs to be considered for its effectiveness and hence student-teachers need to be trained in analyzing their teaching in terms of context variables to establish relationship between presage-context-process-product so that the student teacher can improve his/her teaching as a student and develop transformation learning as a professional. In this study effectiveness of these three methods on achievement, scientific attitude and basic science process skills were found out by establishing fidelity of each method. This could be done effectively through reflective teaching training. Hence the findings imply that student teachers need to be trained in reflective teaching so that they will be familiar with the different approaches of reflective teaching and tools and techniques used for observing and analyzing classroom interaction and improve upon their teaching skills.

Keywords: Constructivism, Reflective Teaching, Constructivist Teacher Education, Reflective Teaching Training Model(RTTM),Integrative Model for Reflective Teaching(IMRT)

INTRODUCTION

The new millennium has been characterized by an unprecedented break-through in knowledge and technology. 21st century challenges have called for new paradigms and "maps" of engagements in spheres of life. Education in particular, continues to play a pivotal role in ensuring national and global survival and growth.

The 'Delores Report' (UNESCO, 1996) sets out an agenda for the future which implies that of significant changes are needed in pre-service teacher education programs to select and prepare a new generation of teachers equipped with the knowledge, skills and values to help their culturally different and their socially disadvantaged students to learn, to reduce conflicts peacefully, to respect each other's dignity and cultures and to become socially responsible citizens [18].

A considerable body of research has shown that pre-service teacher education has a significant impact on early career of teacher's teaching skills and their philosophies of teaching [4],[8]. In particular, constructivist teacher's education has been shown to have a positive impact on student teacher's perceptions of their own

teaching competencies leading to increased confidence and also improved teaching practice within schools [2],[4],[6].

Constructivism

Constructivism is an approach in which the learner is building an internal illustration of knowledge, and a personal interpretation of experience. It is active, constructive, goal-directed, diagnostic and reflective [15].

In constructivist theory, it is assumed that learners have to construct their own knowledge individually and collectively. Each learner has a repertoire of conceptions and skills in which she or he must construct knowledge to solve problems presented by the environment. The role of the teacher and other learner is to provide the setting, pose the challenges, and offer the support that will encourage cognitive construction [3]. Since students lack the experience of experts in the field, teachers bear a great responsibility for guiding student's activity, modeling behavior, and providing examples that will transform student group discussions into meaningful communication about subject matter [5].

Brooks and Brooks (2005) provide a set of descriptors of constructivist's teaching behaviours, which they feel teachers can use to experiment with the approach.[1] The set of descriptors describe teachers to construct their own understandings of content, not simply as providers of information and managers of behavior .Following are the constructivist teaching behaviors identified.

- Encouraging and accepting student autonomy and initiative.

- Use raw data and primary sources, along with manipulations and interactive and physical materials.

- Uses cognitive terminology while framing tasks.

- Allow students' responses to drive lessons, shift instructional strategies and alter content.

- Enquire about students understanding of the concepts.

- Encourage students to engage in dialogue, both with the teacher and with one another

- Encourage students enquiry by thoughtful open ended questions and encouraging students to ask questions to each other.

- Seek elaboration of students initial response.

- Engage students in experiences that might engender contradictions to their initial hypotheses and then encourage discussion.

- Allow wait time after posing questions.

- Provide time for students to construct relationships and create metaphors.

- Nurture students' natural curiosity through frequent use of learning cycle model.

Constructivist Teacher Education

Teacher Educators around the world are exploring the promises and practices of constructivist theories for preparing learners. Wood (1995) suggested that "The alternative perspective that constructivism offers by defining learning as a process of personal construction of meaning offers a potentially powerful way to rethink teacher education" [17]. The work of Rainer (2002) supported this idea and suggested that there are dimensions of constructivist theories that provide a way of reframing teacher education.[12] Richardson (1997) suggested there were two different forms of Constructivist Teacher Education [13]as follows,

- Teaching teachers to teach according to a constructivist approach and

- Working with Teacher -Learner in a constructivist way to help them understand their tacit and introduce new conceptions as possible beliefs and alternatives to those held by the learner.

Rainer and Guyton (2004) reviewed 22 pre-service programs, 11 in-service / graduate programs and seven in service / professional development programs for a total of 40 constructivist's effort.[11] The analysis of these studies made an effort to teach according to the principles of constructivist theories. They synthesized the key features appearing in both the pre-service and in-service programs to identify the constructivist pedagogy for teacher education. The categories of features identified

represent a variety of beliefs and practices that when taken together suggest the following elements of Constructivist Teacher-Education.

Reflection

It is evident from a majority of the programmatic efforts and is seen by many constructivist teacher educators as a sort of adhesive that connects and cements the various components or tasks within a teacher education program. Reflection also is viewed as a necessary catalyst in the active process of reconciling new and potentially dissonant experiences with the prior beliefs and understanding of the learner. Programs include opportunities for reflection about the various readings, discussions, and experiences. Writing in dialogue journals, discourse with other teacher learners, and video-taping coupled with reflection provide other sources of examining practice.

Learner – Centred Instructions

Many constructivist teacher education programs promote Learner-Centred Instruction because of their understanding that learning is minimized by educational settings that take student interests and ownership into account, sharing intellectual control with Teacher-Learners.

Collaborative Learning

Constructivist pedagogy also emphasizes collaborative learning as 'collaborative learning groups' provide contexts and processes for developing positive social skills such as being able to rationally justify an idea or solution to one's peers and to listen critically yet respectfully to the opinions and perspectives of others, and to develop networks of peers that allow connections to be made with other people in a shared experience.

Posing Relevant Problem Solving

In many constructivist programs, the teacher is reviewed as a creator of problem-solving situations, a poser or solicitor of problem that students see as real and important to them. Teacher Educators' learning experiences around the big ideas of the curriculum, making sure those concepts are taught in a context relevant and significant to the Teacher.

Cohort Groups

Several Constructivist Teacher Education programs require their teacher-learners to take courses together in a prescribed sequence as a cohort group. This kind of long-term, shared learning experience fosters a sense of collegiality and cohesion that allows them to take the risk of engaging one another in meaningful dialogue about their beliefs and teaching practices.

Relevant Field Placement

Many constructivist programs provide pre-service teachers with supervised field placements and seminars every semester, with classroom responsibilities growing from observation and reflection to teaching one or two lessons per day, culminating in full time experiences, where the student teachers manage the classroom all day for several weeks and is focused on the children's learning.

Authentic Assessment / Professional Portfolios

Benchmarks, capstones and professional portfolios are evident in several constructivist teacher education programs as techniques that provide opportunities for both formative and summative evaluation and which allow a large degree of student input and creativity.

Inquiry / Action Research

In Constructivist Teacher Education, action research encourages teacher-learners to assess the understandings of children, so that lessons may be developed that maximize the potential for concept development. Action research also is used to evaluate teaching strategies with an eye for improvement. It is often coupled with the elements of reflection and problem-based learning.

Personal Engagement

The use of the term "self" in referring to the importance of teacher-learners is common in the descriptions of features of constructivist teacher education / programs.

According to the review done by Rainer and Guyton, the programmatic elements represent most often, the features of constructivist teacher-education programs they are neither exhaustive nor independent of each

other.

When analyzing the literature on constructivist pedagogy in general and teacher education in particular, 'reflective activities' is a common feature of all the programs irrespective of the discipline. Constructivist teacher education programs build in time for reflective activities as they are considered a crucial part of learning and growing professionally as a teacher.

It is observed from experience as a teacher educator that critical reflection is a key element, but providing requirements and opportunities alone does not ensure deep reflection. Hence, there is a need to continually model reflection and coach teacher-learners / student teacher in the process of reflection, providing a variety of models and feedback or reflective effort.

Reflective Teaching

Reflection is an enquiry based thinking process in which the teacher engages in systematic, rigorous and disciplined thinking about their professional practice. Reflective teaching is a process of self observation and self-evaluation. By collecting information about what goes on in the classroom, and by analyzing and evaluating the underlying beliefs, this may then lead to change and improvement in our teaching. Reflective teaching involves recognizing, examining, ruminating over the way of an individual teacher, as individuals possess their own background and experience, bring certain beliefs, assumptions, knowledge, attitudes and values to teaching. It is also observed that teaching takes place in a social setting that has its own unique characteristics, opportunities and constraints. The practice of reflective teaching explores the implications of all complex factors with the intention of understanding and improving the teaching-learning practice.

Schon (1993) suggested that reflective teaching practice is a continuous process and involves learners thoughtfully considering one's own experience in applying knowledge to practice while taught by professionals [4]. It helps the individuals to develop their own personality. Gibbs (1998) suggests the reflective practice as an individual is developed analysis of feelings, evaluation of experience,

etc [7]. Jasper (2003) associated reflective teaching practice with life-long learning resulting in the development of autonomous, qualified and self directed professionals. Engaging in reflective practice is associated with the improvement of the quality of care, stimulating personal and professional growth and closing the gap between theory and practice.

Lieberman and Miller (1999) pointed out that the practice of reflective teaching, reflective enquiry, and reflection on practice, results in gaining of the personal and professional knowledge that is so important to bring an effective teacher and in shaping children's learning [9].

Han (1995) stated that, the process element of reflection emphasizes on how teachers make decisions, content stresses the substance that drives the thinking and reflective inquiry may set the stage for learning how to be a good teacher [19].

Reflective teaching is a three part process which involves the event, recollection of the event and the review and response to the event. The following approaches facilitate reflective teaching:

- Peer observation
- Written accounts of experience which includes self reports, autobiographies, journal writing, collaborative diary keeping
- Audio or video recording of lessons
- Use of problem solving and decision making
- SWOT Analysis (S-Strength, W-Weakness, O-Opportunity, T-Threat)

Significance of Reflective Teaching in Teacher Education

Reflective practice is used at both the Pre-service and In-service level of teaching. Coaching and peer involvement are two aspects of reflective practice seen most often at the pre-service level. Oianen (1993) conducted a study on how student teachers develop the skills necessary for reflective teaching during their field experiences and explored the role of the teacher educator as coach [21]. Teacher educator can most effectively coach the student teachers in reflective

practice by using the student's personal histories, dialogue journals and small and large group discussions about their experiences to help students reflect upon and improve their practices.

Kettle and Sellar (1996) stated the development of third year teaching students [20]. They analyzed the student's reflective writings and interviewed them extensively about their reflective practices. They found that use of peer reflective groups encouraged student teachers to challenge existing theories and their own pre-conceived views of teaching while modeling for them a collaborative style of professional development that would be useful throughout their teaching careers.

Several research studies have proved that critical reflection upon experience continues to be an effective technique for professional development. It is evident from the studies conducted on reflective teaching practices that, teachers who explore their own teaching through critical reflection develop changes in attitudes and awareness which benefit their professional growth as teachers, as well as improve the kind of support they provide to their students. Teachers engaged in reflective analyses of their own teaching report that it is a valuable tool for self-evaluation and professional growth. Thus it can be concluded that. teaching experience coupled with reflection can be a powerful impetus for teacher development.

The Study

The author conducted a study on the effects of the different methods of teaching science on achievement process skills and scientific attitude of standard six pupils with different achievement levels in terms of knowledge, understanding and application objectives and retention [10].

Objectives

(i) To study the effect of methods, levels of Pre-achievement and their interaction on achievement of knowledge, understanding and application of objectives separately by taking Intelligence as co-variate.

(ii) To study the effect of Methods, Levels of Pre-achievement and their interaction on total achievement

scientific attitude and basic science process skills separately by taking Intelligence as co-variate.

(iii) To study the effect of methods, levels of Pre-achievement and their interaction on retention of knowledge, understanding application objectives and total Achievement separately by taking Intelligence as co-variate.

(iv) To study and compare the teaching processes in terms of interaction patterns associated with the Teacher Demonstration, Guided Discovery and Cooperative Learning Methods of Teaching Science.

(v) To study and compare variations in interaction patterns due to change in prior achievement levels of pupils with respect to Teacher Demonstration, Guided Discovery and Cooperative Learning Methods of Teaching Science.

(vi) To explain the relationship between significant differences in Achievement, Scientific Attitude and Basic Science Process Skills in terms of differences in the teaching process.

Methodology

It was an experimental study in which the main and interaction effects of methods of teaching and levels of Pre-achievement were studied on Achievement in Science, Scientific Attitude and Basic Science Process Skills by taking Intelligence as co-variate by applying 3x2 factorial design with co- variate.

For detailed analysis of presage-context-product part of the study, the relative effectiveness of Teacher Demonstration, Guided Discovery and Cooperative Learning Methods of Teaching Science was done by employing ANOVA (Analysis of Variance). In order to study the interaction patterns associated with the Teacher Demonstration, Guided Discovery and Cooperative Learning Methods of Teaching and variation in the interaction patterns due to change in pre-achievement levels of pupils and to study the relationship between teaching process and learning outcome related to the dependent variables of the study, the investigator transcribed the lessons which were videotaped. The data was coded using 'Verbal Interaction Category System'

(VICS). Interaction patterns associated with the Teacher Demonstration Guided Discovery and Cooperative Learning Methods of Teaching and variation in interaction patterns due to difference in pre-achievement levels were studied by using different methods.

The study revealed the following,

1. The standard Six pupils' achievement in science taught through Teacher Demonstration Method is more effective than

(i)   The Guided Discovery Method on the criterion of the knowledge objective, understanding objective and total achievement and

(ii) The Cooperative Learning Method on the criterion of Achievement.

2. Guided Discovery Method of Teaching Science is significantly more effective than the Teacher Demonstration Method and Cooperative Learning Method in improving the Basic Science Process Skills of Low achievers of Standard Six.

3. Cooperative Learning Method of Teaching Science is significantly more effective than the Teacher Demonstration Method and Guided Discovery Method in improving the Basic Scientific Attitude and retention of achievement on the application objective among high achievers due to the Process variables as follows,

- Pupils response to the questions or idea of another pupil .

- Pupils initiated talk to another pupil.

- Student –response behavior followed by teacher-initiated behavior.

- Student response statement followed by student initiated statement.

- Extended student initiated talk to either the teacher or another student.

- Teacher response ratio, pupil initiation ratio, instantaneous teacher response ratio and pupil steady ratio.

4. The low achievers taught through Guided Discovery Methods of Teaching Science retain the learning outcome of Application objectives significantly better than the following,

(i)   The low achievers taught through the Teacher Demonstration Method and Cooperative Learning Method of Teaching and

(ii) The low achievers taught through Guided Discovery Method of Teaching.

5. Cooperative Learning Method of Teaching Science is significantly more effective than the Teacher Demonstration Method and Guided Discovery Method on the learning outcomes of the Application objectives among high achievers and on the retention of high achievers with respect to the application objectives.

Implications for Teacher Education

1. The results of the experiment have revealed that the effects of the Teacher Demonstration Method, Guided Discovery Method and the Cooperative Learning Method of Teaching Science depend upon the criterion to be measured as well as the Pre-Achievement Levels of students. Therefore, Pre-service teachers should be trained in all the three Methods of Teaching and avail their use in different context.

2. It was found out from the teaching process analysis of the Teacher Demonstration Method, Guided Discovery Method and Cooperative Learning Method of Teaching Science to Standard Six pupils that, the Teacher Demonstration Method of Teaching Science was associated with direct patterns, the Guided Discovery Method of Teaching was associated with indirect patterns and the Cooperative Learning Method of Teaching was associated with the indirect patterns to the minimum and the students' direct interaction to the maximum. These findings imply that, while guiding and training student teachers for methods, training in the respective patterns of teaching should be given.

3. In the present study, the effectiveness of the Teacher Demonstration Method, the Guided Discovery Method and the Cooperative Learning Method on pupils' Achievement, Scientific Attitude and Basic Science Process Skills was found out by establishing the fidelity of each method. This implies that the theory on fidelity and training in establishing fidelity of the treatment has the

strong base to be included in under Content-cum – Methodology of Teaching Science in Teacher Education Courses.

4.   The theory and practice of Cooperative Learning would be an effective methodology or technique to be included in Teacher Education Courses.

5.   Workshops and Seminars conducted to In-service teachers on the theory and practical experience of Cooperative Learning will provide an exposure to fresher approaches to be practised in the classroom.

6.   If Pre-service teachers are exposed to the knowledge and practice of the Basic Science Process Skills using creative techniques of teaching, their ability of using every activity related to the teaching of science to develop the Science Process Skills and consequently the Scientific Attitude will be enhanced.

Recommendations

The study revealed that methods have differential effects on different context, that is, different pre-achievement levels. These differences were due to differences in the process variables. Hence the study recommends that to implement any method, the context needs to be considered for its effectiveness and hence student-teachers need to be trained in analyzing their teaching in terms of context variables to establish relationship between presage-context-process-product. So that the student teacher can improve upon his/her teaching as a student and develop transformative learning as a professional.

The study also revealed from the process analyses of the three methods that, teacher demonstration was associated with indirect patterns and the co-operative learning was associated with the indirect pattern to the minimum and the students' direct interaction to the maximum. These findings imply that, guiding students-teachers for different methods, training the respective patterns of teaching should be given and evaluating their lesson the observer needs to concentrate on these patterns and while giving feedback to the student teacher, emphasis should be given to reflect on these factors and improve upon the teaching skills. In the study,

effectiveness of these three methods on achievement, scientific attitude and basic science process skills was found out by establishing the fidelity of each method. This implies that the theory on fidelity and training in establishing fidelity of the treatment has the strong base to be included in under Content-Cum-Methodology of teaching in general and science, particularly in teacher-education. This could be done effectively through reflective teaching training. Hence, student teachers need to be trained in reflective teaching so that they will be familiar with the different approaches of reflective teaching and the tools and techniques used for observing and analyzing classroom interaction and improve upon their teaching skills.

It is evident from the research reviews on reflective teaching that, it enhances the teaching competencies of the student-teachers and results in transformative learning as a professional. Thus these findings recommend to integrate reflective teaching practice as an integral part of all teacher education. An attempt is made to develop an integrative model for reflective teaching practice at the teacher education level.

Proposed Integrative Model for Reflective Teaching

Figure 1 shows the Reflective Teaching Training Model and Figure 2 shows the Integrative Model for Reflective Teaching Practice.
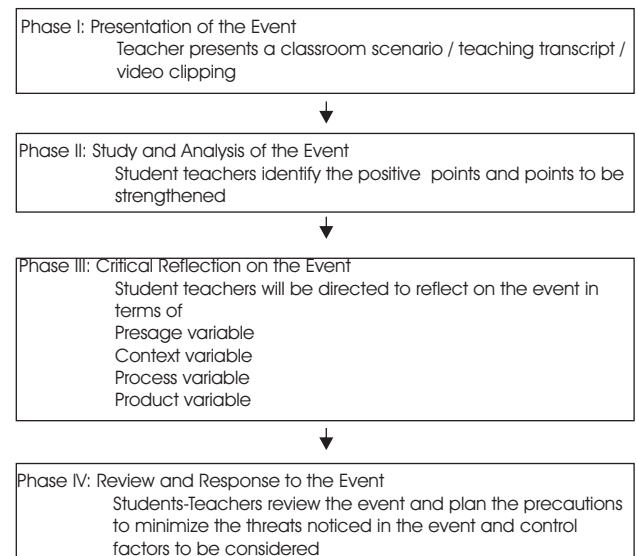

Figure 1. Reflective Teaching Training Model

Step One: Orientation and theory demonstration on reflective teaching.

As in initial phase, an orientation programme is suggested to create awareness on reflective thinking and develop an understanding about reflective teaching through reflective teaching model.

Step Two: Practice Teaching

As a regular feature of all teacher education courses the student-teacher will practice in the schools allotted. During the teaching process, class teacher, teacher educator and peers observe the lesson and record the observation in the evaluation proforma / observation schedule provided.

Step Three: Student-teacher's reflection

Soon after the lesson student-teacher will be given the period for reflection. The reflection will be mainly related to presage, process, context and product variables. Further these could be specifically directed as oneself as student teacher, context of teaching learning like, classroom climate, student diversity, pupils knowledge and attitude and Process aspects such as pupil classroom behavior management and classroom interaction. Product variable in terms of relevance of evaluation in tools and techniques, formative and summative evaluation, student responses, and learning gaps should identified. Reflection is also done on self as student teacher as well as in the knowledge of context and pedagogy. These will be done using self evaluation tool, writing reflective journal

and student diary.

Step Four: Collaborative Inquiry

After the student teacher's self reflection, observers (peers, class teacher, and teacher educator) will discuss the lesson with the student-teacher; constructive feedback will be given as per the observation. The student-teacher will go through the self reflection on points and the feedback is received. Collaborative inquiry will end with the 'SWOT analysis', which includes identification of the strengths, weak points, areas needs to be strengthened, and precautions to minimize the threats.

Step Five: Preparation of an action Plan

Student-Teacher will prepare an action plan for future lesson based on the critical reflection of the previous lesson.

Conclusion

The ever changing and multiple roles of teachers require decision making necessary for success in highly complex diverse community environments in which they practice. The demands of teachers is to always try to be conscious of their professional roles and responsibilities and strive to enhance their professional knowledge and skills. Hence, there is a need to inspire prospective and practising teachers to develop critical thinking and reflective practice which results in transformative learning which is the need of the hour. The proposed Reflective Teaching Training Model (RTTM) and Integrative Model For Reflective Teaching (IMRT) can be used by teacher education institutions to strengthen the teaching skills among student-teachers. Theoretical knowledge as well as models can be used by the in-service teachers who are interested in professional growth and institutions which organize in service teacher education programs.

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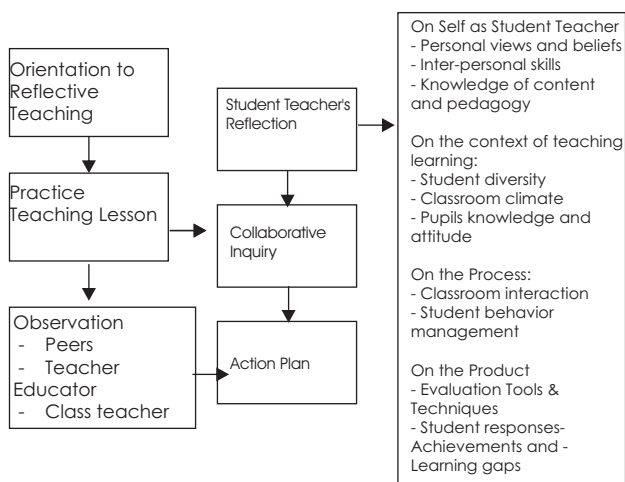
Figure 2. Integrative Model for Reflective Teaching Practice

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