
PRE-SERVICE SCIENCE TEACHERS REFLECTIVITY ON THE SEQUENCE
AND CONSEQUENCES OF POWERPOINT PRESENTATIONS
IN MICROTEACHING

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ABSTRACT: Globally, a step up from routine teaching to technology enhanced one continues to grow exponentially and this has serious implications for the nature and purpose of Educational institutions. (PowerPoint Microsoft corp.) is a widely used presentation program that originated in the world of business but has now become common place in the world of Education Technology. It is a tool one can use to communicate ideas effectively through visual aids that look professionally designed yet are easy to make, with its slides created for presentation either through over-heads or on-screen electronic shows. In addition with preparation of speaker notes, outline printing and audience hand-outs among others in required output; culminated a file make-up in PowerPoint presentation. In acknowledgement of the benefits accruing such practice, many countries have incorporated PowerPoint in their teacher preparation program. This study therefore involved a set of Thirty-eight (38) pre-service Science teachers in their second year; who made the successful list in first semester examination of 2011/2012 session, in a College of Education, South-West, Nigeria. They were subjected into microteaching mood as a system of controlled practice that makes it possible to concentrate on specified teaching behaviour in order to give the pre-service Science teachers confidence, support and feedback by letting them try out among friends and colleagues a short slice of what they plan to do with their real students during their professional practice in schools. This serves as a medium of reflection and a genuine lens into the world of practice. Exposure to this activity succeeded their performance in the theory of practicum teaching in their first semester examination which serves as a pre-requisite for the microteaching as dictated by National Commission for Colleges of Education in Nigeria. The researcher sought for stages of reflectivity as adapted from Amobi, 2005 to Describe, Inform, Confront and Reconstruct the contents of the lesson in a micro teaching by Pre-service Science teachers with and without PowerPoint presentation in an experimental study. The four hypothesis generated to guide the study were answered having subjected the data collected to Pearson Correlation Coefficients and ANOVA statistics while conclusions and recommendations were made.

Introduction

The ability of modern Computers to bring Multimedia Resources into the Classroom is having an increased effect on the way teachers teach. If teachers have the necessary hardware

to present these resources to the class, then PowerPoint becomes as much of an everyday tool as a textbook or even a piece of chalk. Once PowerPoint or ICT resources in general have been created, they can be exchanged with colleagues or modified to suit the specific needs of subject groups and classes without any reprographics cost. As documented in (Mills,2003; Prescott and Oduyemi, 2003; Jones,2003) PowerPoint is a tool one can use to communicate ideas effectively through visual aids that looks professionally designed yet are easy to make. With PowerPoint one can create slides for presentation in a required output; black and white overheads, colour overheads, 35mm slides or on-screen electronic shows. In addition, one can prepare speaker's notes, print an outline and print audience handouts .All these components in one file make up a Power Point Presentation.

In a research conducted recently by (**Teachnology, Inc. 2012**), Seen as the Industry standard for delivering interactive multimedia presentations, Microsoft PowerPoint, almost a decade now, is beginning to pop-up in Classrooms of all levels in many nations. PowerPoint according to this research is a wonderful tool for learning in both a student and teachers directed situation. It can add a new dimension to learning allowing teachers to explain abstracts concepts, while accommodating all learning styles. Used properly, PowerPoint can be one of the most powerful tools for disseminating information ever known. Employed inappropriately, could potentially confuse students and make learning a difficult process. This submission agreed expressly with the study conducted by (**Center for Teaching and Learning, Minnesota University, 2008**) that there are both positive and negative aspects to using PowerPoint in the classroom. First, the positives PowerPoint is easy for teachers to update, saving their time and energy. It's neat and clean, and it allows for "portability" of materials. Teachers can take slides from one teaching, update them, include them in another teaching, and share them with colleagues or students. It also provides a platform for incorporating a variety of different kinds of multi-media file-types: images, video, audio, and animations. There are also drawbacks to using PowerPoint as a teaching tool. PowerPoint, when used incorrectly, can encourage student (and teacher) passivity by discouraging interaction between them. Users, as documented by (Godin, 2001) often overload slides with information, forcing them to move through the material too quickly while overwhelming audience with details. This can sometimes discourage listeners to stop listening to the speaker.

However in Nigeria, not much has been accomplished in the use of PowerPoint for classroom teaching and so its incorporation calls for a teacher's ability to reflect on their practice which is an important element in the teaching of sciences and also a core element of any successful education program. Pre-service Science teachers Reflectivity upon their significant new experiences will lead to learning and cognitive development whilst its absence can pose a risk that they may rely on routine teaching. This also helps them to show capacity or disposition to analyze the sequence of what they are doing and to reconstruct their

professional and personal knowledge schemes and consequently making a judgment to adapt their practice to best match the needs of students.

In the business world where this tool is originated, Triple 'P' i.e. PowerPoint Paralysis is not uncommon. **Teachnology, Inc** defined this phenomenon as an overzealous concentration on the utilization of PowerPoint, while concurrently disregarding the content being exhibited. Therefore, as skilled educators, in order not to allow this practice to manifest itself in our classrooms, educators must realize their susceptibility by engaging in reflective teaching. In this case according to (Efe, 2010) teachers show a capacity to analyze the process of what they are doing and to reconstruct their professional and personal knowledge schemes, while simultaneously making a judgment to adapt their practice to best match the needs of students.

Technology is a lot of things, but it shouldn't take the place of well-polished traditional methods of teaching and learning. It is meant to enhance teaching and learning which confirms further the emphasis of (Hitch, 2002) that whatever the teaching level, the most important thing to note is that the PowerPoint needs a teacher to bring it to life, to explain the concepts, to put it in context, to relate it to the real world, to expand the subject and to teach the lesson. PowerPoint is only a tool. It will not, in and of itself, improve student learning. It's the way the teachers use PowerPoint that can encourage student learning. By strategically employing it to create opportunities for active learning, teachers can capitalize on PowerPoint's strength as a presentation platform to engage students in the learning process. When it comes to enhancing learning, black boards are good, overheads are better, but PowerPoint is the best. PowerPoint is a great tool for learning, but the user should watch out for triple "P". Once a teacher start his/her voyage in PowerPoint Presentation, it is essential to reflect i.e. to examine what he/she does in the classroom, considers why it is done and if it works. This submission is in line with (Ige and Kareem, 2011) that reflective practice is particularly important in science classrooms which are activity based where students are encouraged to actively control and take charge of their learning. Therefore, teachers must be properly prepared and equipped to provide vibrant environments for students to learn science which can be achieved when they are encouraged to practice reflective teaching. Reflective teaching involves subjecting teachers' beliefs, attitude and assumptions about classroom practice to critical analysis and evaluation. It deals with a critical examination of a teacher's motivation, thinking and practice of which information gathered from this type of analysis can be used to explore his/her teaching practices, beliefs and motivation which may result in improvements in teaching general professional development enhancement. It also corroborate (Amobi, 2005) who revealed that effective teaching and reflective teaching have long been acknowledged as desirable goals of teacher education programs while several studies such as (Demirtas, 2002; Higgins and Nicholl, 2003) have attested to the fact that microteaching sessions are a viable vehicle for meeting the desired goals of preparing pre-

service teachers to become effective and reflective teachers. In this kind of condition, pre-service teacher develops skills in drawing learner's attention, prepare lesson plan, asking questions, using and managing time effectively. Also, they acquire skills to choose appropriate activities, teaching style, use teaching goals to overcome difficulties encountered during the process. Microteaching is a technique that is used in teacher education where a pre-service teacher teaches a small portion of a lesson to a small group of his/her classmates and teaching competencies are carried out under strict supervision with immediate feedback. This kind of practice according to (Amobi and Irwin, 2009) promotes effective and reflective teaching in pre-service teacher and also shows that preparation, organization and presentation with feedback are important to learner's learning.

Statement of the Problem

Bringing innovation into the classroom is on the high side in the educational policies of nearly all the nations of the world. Teaching is gradually going beyond traditional set-up into technological step-up. However, since science teaching is a profession that requires specialized knowledge and skills, pre-service science teacher, in order to perform their jobs should possess certain competencies. And to acquire these competencies, they should be given intensive and effective training before starting their profession which is the baseline for this study. Incorporation of the use of PowerPoint Presentation in the microteaching sessions of prospective teachers calls for reflection which is an important element of science teaching and a core element of successful education program for sincere judgment of the sequence and consequences of the practice. Just in line with the opinion of (Jones, 2003) that PowerPoint Presentation is a valuable aid to presentation and reflection in practice provided that its use has been carefully considered in terms of pedagogy. Therefore, in the spirit of Technology i.e. examining technology with educator's perspective as promulgated by (Technology, Inc. 2012) informed the focus of this study to look into Pre-service science teacher's reflectivity on the sequence and consequences of PowerPoint presentations in a microteaching session. Hence, four research questions based on four levels of reflection as adapted from (Amobi, 2005) were generated to guide the study that:

1. What is the effect of PowerPoint on what the teacher intended to do?
2. What is the effect of PowerPoint on what the teacher did?
3. What is the effect of PowerPoint on what happen during the lesson?
4. What is the effect of PowerPoint on what the teacher will do differently if he/she's to teach the lesson again?

Research Hypotheses

H₀₁: Is there any significant relationship between the first level reflection by experimental group A and control group B in Microteaching sessions.

- Ho₂:** Is there any significant relationship between the second level reflection by experimental group A and control group B in Microteaching sessions.
- Ho₃:** Is there any significant relationship between the third level reflection by experimental group A and control group B in Microteaching sessions.
- Ho₄:** Is there any significant relationship between the fourth level reflection by experimental group A and control group B in Microteaching sessions.

Research Sample and Sampling Techniques

The study involved the use of two groups simple randomized experimental design on a set of Thirty-Eight(38) Part Two, Pre-service Science Teachers on the pass list of 2011/2012 first semester. In College of Education, Ikere-Ekiti, South-west, Nigeria. The sample were divided into Two groups having arranged their names in alphabetical order with the first half representing the Experimental group A and the second half representing the Control group B.

Research Instruments and Administration

The medium of gathering data for this study was Microteaching session in a Microteaching Laboratory of the School and Microteaching Observation Schedule (MOS) which was developed by the researchers in line with the focus of this study as adapted from (Amobi, 2005) to observe critically according to the lesson plan what the teacher intended to do, what the teacher did, the situations of the lesson and the response of the teacher to those situations. And then what the teacher did differently in the second teaching based on the feedback given after the first teaching.

This instrument was validated by the researchers in a try out study on a set of pre-service teachers from other departments within the school in a similar exercise also with other information gathered from other lecturers within and outside the school and the reliability of the instrument was considered using scorer reliability in which $r = 0.88$ which is moderate for this type of study. Samples were subjected to microteaching session in which group A taught the lesson with PowerPoint Presentation while group B taught without PowerPoint Presentation. This exercise followed their previous training and experiences in Practicum and Teaching methodologies, a pre-requisite course for Microteaching as part of the requirements for the award of National Certificate in Education (NCE). The researchers sought for levels of Reflection as adapted from (Amobi, 2005) of which the subjects were to

- 1st Describe:** The researchers sought for presentation of the content of the lesson whether it is logical or illogical, sequence or disarray.
- 2nd Inform:** The researchers sought for how the content was presented during the lesson whether it is ambiguous or simplified, definite or indefinite.
- 3rd Confront:** The researchers sought for how the teacher faced the reality of the lesson whether passive or active, affirmative or defensive.

4th Reconstruct: The researchers sought for what the teacher did differently in the second teaching whether progressing or regressing, whether the same mistakes were corrected or repeated.

This exercise took a period of two weeks of which the first week was used for the first teaching while the second week was used for the second teaching. The subjects taught Energy as dictated by the new secondary school curriculum for Ten (10) minutes with appropriate feedback at the end of each teaching in order to create room for reflection. The effect of PowerPoint presentation was also determined on the groups.

Table 1: Displaying Group A Levels of Reflection in the Microteaching Sessions

Sample/Reflection	Describe		Inform		Confront		Reconstruct	
	logical	illogical	Simplified	Ambiguous	Active	Passive	Progress	Regress
1		*	*		*		*	
2	*			*	*		*	
3		*		*		*		*
4		*	*		*			*
5	*		*		*		*	
6	*			*		*	*	
7	*		*		*		*	
8		*	*			*		*
9		*		*	*		*	
10	*			*		*		*
11		*	*			*	*	
12		*		*	*		*	
13	*		*		*		*	
14	*		*		*		*	
15	*			*	*			*
16		*	*			*	*	
17	*			*		*	*	
18		*		*		*	*	
19		*	*			*	*	

Table 2: Displaying Group B levels of Reflection in the Microteaching Sessions

Sample/Reflection	Describe		Inform		Confront		Reconstruct	
	Logical	Illogical	Simplified	Ambiguous	Active	Passive	Progress	Regress
1		*	*		*			*
2		*		*		*	*	
3	*			*	*		*	
4		*		*		*		*
5	*		*		*		*	
6		*	*			*	*	
7		*		*	*			*
8		*		*		*		*
9	*			*		*		*
10	*		*		*		*	
11		*	*		*			*
12		*		*	*			*
13		*	*		*			*
14		*		*		*		*
15	*		*			*		*
16		*		*		*		*
17	*		*		*		*	
18	*		*		*		*	
19	*			*		*		*

Note: The score for each level of reflection is either 1 or 2 as indicated in the table 1&2.

Research Hypothesis Testing

The Four Hypotheses generated for this study were answered having subjected the data collected from the Microteaching sessions to Pearson rank correlation coefficients and the results of the analysis were as follows:

H₀₁: Is there any significant relationship between the first level of reflection by experimental group A and control group B in Microteaching sessions.

Table 3: Illustrate correlation between First level of Reflection between Group A & Group B

Group	n	x	SD	r- calculated	r-table
Group A	19	1.5263	.51299	.517	.433
Group B	19	1.2632	.49241		

Significant at 0.05 level

From the table above, r- calculated value (.517) > r-table value (.433) and the standard deviation of .51299 for Group A and that of .49241 for Group B indicated a significant result. Consequently, there is significant relationship between first level of Reflection by Experimental group A and control group B in Microteaching sessions.

Ho₂: Is there any significant relationship between the second level of reflection by experimental group A and control group B in Microteaching sessions.

Table 4: Illustrate Correlation between Second Level of Reflection between Group A & Group B

Group	n	x	SD	r- calculated	r-table
Group A	19	1.542	.5124	.688	.433
Group B	19	1.4737	.5010		

Significant at 0.05 level

From the table above, r- calculated value (.688) > r-table value (.433) and the standard deviation of .5124 for Group A and that of .5010 for Group B indicated a significant result. Consequently, there is significant relationship between second level of Reflection by Experimental group A and control group B in Microteaching sessions.

Ho₃: Is there any significant relationship between the third level of reflection by experimental Group A and control Group B in Microteaching sessions.

Table 5: Illustrate correlation between third level of Reflection between Group A & Group B

Group	n	x	SD	r- calculated	r-table
Group A	19	1.578	1.5263	.156	.433
Group B	19	1.527	1.5789		

Significant at 0.05 level

From the table above, r- calculated value (.156) < r-table value (.433) and the standard deviation of 1.5263 for Group A and that of 1.5789 for Group B indicated not significant result. Consequently, there is no significant relationship between third level of Reflection by Experimental group A and control group B in Microteaching sessions.

Ho₄: Is there any significant relationship between the fourth level of reflection by experimental group A and control group B in Microteaching sessions.

Table 6: Illustrate correlation between fourth level of Reflection between Group A & Group B

Group	n	x	SD	r- calculated	r-table
Group A	19	1.482	.5143	.682	.433
Group B	19	1.479	.512		

Significant at 0.05 level

From the table above, r -calculated value (.682) > r -table value (.433) and the standard deviation of .5143 for Group A and that of .512 for Group B indicated a significant result. Consequently, there is significant relationship between fourth level of Reflection by Experimental group A and control group B in Microteaching sessions.

The Bottom Line

The results above showed that PowerPoint is just another tool that allows teachers to teach. This is to further buttress the submissions of (Technology, Inc, 2012) that technology is a lot of things, but it shouldn't take the place of well-polished traditional methods of teaching and learning rather should complement it. It is meant to enhance teaching and learning which confirms further the emphasis of (Hitch, 2002) that whatever the teaching level, the most important thing to note is that the PowerPoint needs a teacher to bring it to life, to explain the concepts, to put it in context, to relate it to the real world, to expand the subject and to teach the lesson.. Also, the result revealed the potency of PowerPoint in enhancing teaching just in line with the submission of (**Center for Teaching and Learning, Minnesota University, 2008**) that What makes PowerPoint so effective is its simplicity because the simple diagrams and basic blackboard work that are essential to all teaching are directly transferable to PowerPoint presentations.

By learning how to use PowerPoint effectively teachers can create presentations that will enhance their traditional teaching methods. This of course corroborates (Hill, Arford, Lubitow, and Smollin 2012) that using PowerPoint improves teaching. It certainly does help with organization, with keeping teachers on track, but PowerPoint does not easily accommodate digressions or a change in order that responds to what's happening at the moment. We know that some of us digress too much, but there's a spontaneity to good discussion that fits uncomfortably with a predetermined sequence of slides .Perhaps this could be a reference to non significant result in the third level of reflection between the two groups in microteaching sessions. Like so many instructional practices, PowerPoint is not inherently good or bad. It's all about how we use it and that is not something about which we can afford to be complacent. This is a reflection of the work of (Godin, 2001) that speaker often overload slides with information, forcing them to move through the material too quickly while overwhelming audience with details. This can sometimes discourage listeners to stop listening to the speaker which also confirms the remark of (**Center for Teaching and Learning, Minnesota University, 2008**) about the drawbacks to using PowerPoint as a teaching tool. When used incorrectly, it can encourage student (and teacher) passivity by discouraging interaction between them. This of course is nothing but the Triple 'P' in action according to (Technology, Inc. 2012).

Therefore, this kind of practice requires reflection in practice in order to maximize the good aspect of it with express agreement with (Ige and Kareem, 2011) that reflective practice is

particularly important in science classrooms which are activity based where students are encouraged to actively control and take charge of their learning. While pre-service teachers must be properly prepared and equipped to provide vibrant environments for students to learn science which can be achieved when they are encouraged to practice reflective teaching. Finally, this kind of practice according to (Amobi & Irwin, 2009) promotes effective and reflective teaching in pre-service teacher and also shows that preparation, organization and presentation with feedback are important to learner's learning.

Research Implications

This research suggests to teacher training institutions the incorporation of PowerPoint Presentation in Science teaching which can of course be generalized to other subjects and professions in schools .It also call for reflection by the government on the upgrading of the status of ICT resources in our schools especially in Nigeria. In-service and Pre-service teachers are also admonished to brace up on the use of ICT resources in the enhancement of teaching and learning in schools.

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