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THE PRACTICE OF MICRO-TEACHING AMONG PRE-SERVICE TEACHERS: FOR POLICY FORMULATION

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ABSTRACT

The supplementation of micro-teaching with video-recording can provide benefits to pre-service teachers along pedagogical content knowledge and reflective practice. This idea is based on the perceptions of pre-service science teachers after they have viewed video-recordings of their micro-teaching.

Although the participants felt some anxiety when informed that their micro-teaching will be recorded on video, they also perceived that some actions, both on the part of the subject teacher and on the micro-teacher, can be done to alleviate this anxiety.

There was a significant negative relationship between micro-teaching grade and perceived drawbacks of being under a video camera *i.e* the higher the grade, the lesser the perceived extent of disadvantages of being video-recorded. In general, the benefits of video-recording outweighed its drawbacks. Thus, the combination of micro-teaching and video-recording can assist in student development, in relation to both pedagogical content knowledge and reflective practice. Consequently, an institutional policy that requires the supplementation of micro-teaching with video-recording may be considered.

Keywords: *video-recording, micro-teaching, pre-service science teachers*

INTRODUCTION

Among the competencies that an effective science teacher needs, pedagogical content knowledge and reflective teaching appears to be at the forefront. Both can be developed starting at the pre-service level.

Pedagogical content knowledge (PCK) involves knowing how to teach the concepts, skills, attitudes and/or values that are specific to a certain subject. It has five aspects namely orientation to teaching, knowledge of curricula, knowledge of student prior understanding and potential difficulties, knowledge of successful instructional strategies and knowledge of assessment (Magnusson *et al*., 1999, as cited by Etkina, 2010). This PCK can only be acquired by actively constructing it in the process of teaching and one way to do this is through micro-teaching (Etkina, 2010).

Micro-teaching, which can be done both in-service and pre-service, is a scaled-down, simulated teaching encounter to provide the teacher with an opportunity for the safe practice (*i.e.* protected environment) of teaching skills (Maheshwari, 2011). It is most effective with groups of four to six members, be it actual students or peers, should be complete but brief and should be around 12 to 15 minutes in length (Salandanan, 2008).

In addition to possessing PCK, teachers must have the ability to reflect on their practice. Being a reflective practitioner means that a teacher has the ability to observe and through a complex process of thinking, the teachers learn from what they observe (Malderez and Wedell, 2007). This means that, teachers must be able to look back at why or

how their performance progressed the way it did (Salandanan, 2008). They must be able to explore critically their own teaching practice for self-improvement and development. Further, reflective teaching should begin at the early stage of teacher training (Orlova, 2009).

To contribute to the development of PCK of future teachers, educators need to provide feedbacks then slowly reduce the extent of this as they become more skilled (Etkina, 2010)–an idea called 'cognitive apprenticeship'. However, since the supervising or critic teacher will not always be at hand, a valuable tool to assist reflection is video-recording (Orlova, 2009). Orlova (2009) elaborated that video-recording is an objective and permanent source that can be viewed repeatedly. It can serve as a stimulus for self-reflection, particularly in answer to the question "What can I improve?" and in relation to feedback from other observers (*e.g.* teacher educator and peers) (Orlova, 2009). In fact, the major responsibility of a pre-service teacher is to implement instruction and reflect on what happened in class (Etkina, 2010).

Micro-teaching. Around the world, various researches have been conducted regarding micro-teaching. Examples of these places are the works of Palupi (2011) in Indonesia; Kamboj *et al.* (2010) in India; He and Yan (2011) in China (*e.g.*,); Igwe *et al*. (2013) in Nigeria; Dweikat (n.d.) in Palestine; Can (2009) in Turkey; Lange and Nerland (n.d.) in Norway; Donnely and Fizmaurice (2011) in Ireland and Guo (2009) in Canada.

Most of the researchers including Palupi, 2011; Donnely and Fizmaurice, 2011; Kamboj, 2010; He and Yan, 2010 and Guo, 2009 indicated that micro-teaching was a useful technique for both personal and professional development, even as others have recognized its 'artificiality' (*e.g.* Donnely and Fizmaurice, 2011; He and Yan, 2011). Some involved as low as six participants (*e.g.* Can, 2009) or as high as 500 (*e.g.* Igwe, 2013). Some were qualitative in nature (*e.g.* Donnely and Fizmaurice, 2011; Palupi, 2011); others were quantitative (*e.g.* He and Yan, 2011; Kamboj, 2010). Some have involved only one session of micro-teaching (*e.g.* Guo, 2009), others had two (*e.g.* Kamboj, 2010) or three sessions (*e.g.* Palupi, 2011). A recurring theme in these studies is that micro-teaching was effective in enhancing growth when it was used to provide feedback to the micro-teacher.

Video-recording of micro-teaching. Earlier studies also had the micro-teaching recorded on video (*e.g.* Donnely and Fizmaurice, 2011; Palupi, 2011; Kamboj, 2010; Guo, 2009). This recording was done to assist in the process of feedback, which may come from the teacher, from peer-observers, from the micro-students themselves and/or from the micro-teacher himself/herself. The last, self-reflection, can surely be enhanced by video-recording (Fukkink and Trienekens, 2010; Can, 2009; Dweikat, n.d.; Nhu and Thuy, n.d.), especially because a video-record of the micro-teaching can be reviewed repeatedly, thus building up tolerance in seeing one's self in action and allowing for a more detached stance in relation to teaching performance (Donnely and Fizmaurice, 2011). Video-recording, aside from being a tool for reflection, serves as a permanent and objective record of what transpired (Orlova, 2009; Nhu and Thuy, n.d.).

The Benguet State University (BSU) offers both undergraduate and graduate teacher education programs with various specializations. One of the undergraduate programs is Bachelor of Secondary Education (BSE) major in Physical Science. Although many studies have been done involving video-recorded micro-teaching, it appears that there were no studies conducted in the University so far in relation to the video-recording of the micro-teaching of students. Thus, this study was conducted involving these pre-service physical science teachers. Results can provide information to teachers about possible benefits derived from recording (on video) the micro-teaching of their students. They might also become bases for policy formulation.

Conceptual Framework

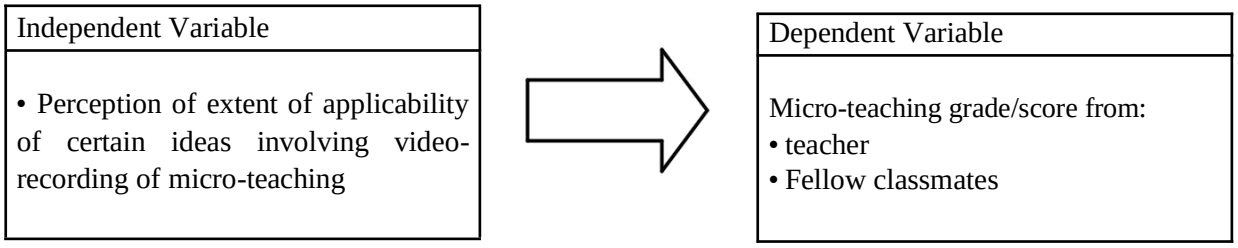

Figure 1. The variables of the study

Objectives

The study investigated the perceptions of pre-service physical science teachers regarding the video-recordings of their own micro-teaching. Specifically, it aimed to determine the:

1. perceived extent to which the video of micro-teaching can be:
a. beneficial to the micro-teacher, in general,
b. beneficial to the micro-teacher's teaching practice,
c. disadvantageous to the micro-teacher, as a permanent record,

2. perceived extent to which the action of being video-recorded:
a. can impinge on the micro-teacher, b. can impinge on classroom interactions,

3. perceived extent to which video- recording can produce worry or anxiety from the micro-teacher at the outset,

4. perceived extent of what should be done by both the subject teacher and the micro-teacher in order to reduce anxiety that are video-recording-related,

5. relationship between perceptions (of extents, as stated in Objectives 1-4) and micro-teaching grade.

METHODOLOGY

The research was conducted at the Benguet State University from December 2012 to May 2013. The participants were all 16 pre-service physical science third year BSE (Physical Science) student teachers during the 2nd semester of school year 2012-2013 in the subject PS 140 (Teaching Strategies in Physical Science).

Data were collected through a questionnaire after the students have received and viewed copies of their own video (one of the two micro-teaching sessions was recorded on video). The questionnaire was based from the thematic analysis of responses of an earlier batch (during the 2nd semester, 2011-2012) of pre-service physical science teachers who responded to general questions involving the video-recording of their own micro-teaching. Each item in the questionnaire was rated on the extent to which it applied to the participant using the following scale:

Scale	Mean Rating	Descriptive Equivalent
3	2.50 – 3.00	High extent (H)
2	1.50 – 2.49	Moderate extent (M)
1	0.50 – 1.49	Low extent (L)
0	0.00 – 0.49	(does not apply at all)

The micro-teaching involved a teaching strategy (either student- or teacher-centered; involving either a skill, a scientific value/ attitude or a concept) that the pre-service teacher got through the drawing of lots. The micro-teaching was graded by both the subject teacher and the eight classmates who acted as observers (the remaining students acted as the micro-teaching students), using a rubric involving;

- demonstration of the teaching technique (20%)
- organization of the lesson (20%)
- time management (20%)
- smoothness of flow of lesson (10%)
- completeness of content (10%)
- accuracy of content knowledge (10%)
- Confidence (10%)

These micro-teaching grades were obtained from the subject teacher specifically for this study.

The Spearman rank correlation was used to determine the relationship between perceptions (for this, the total score for the 'extent' was used) and micro-teaching grade. This non-parametric test was selected over the Pearson product correlation because there were only 16 participants and normality cannot be assumed. The following interval, based on the "rule-of-thumb", was used:

Interval	Description
.40 - .69	Strong relationship
.30 - .39	Moderate
.20 - .29	Weak
.01 - .19	Negligible

The flow of the study is shown by the following diagram:

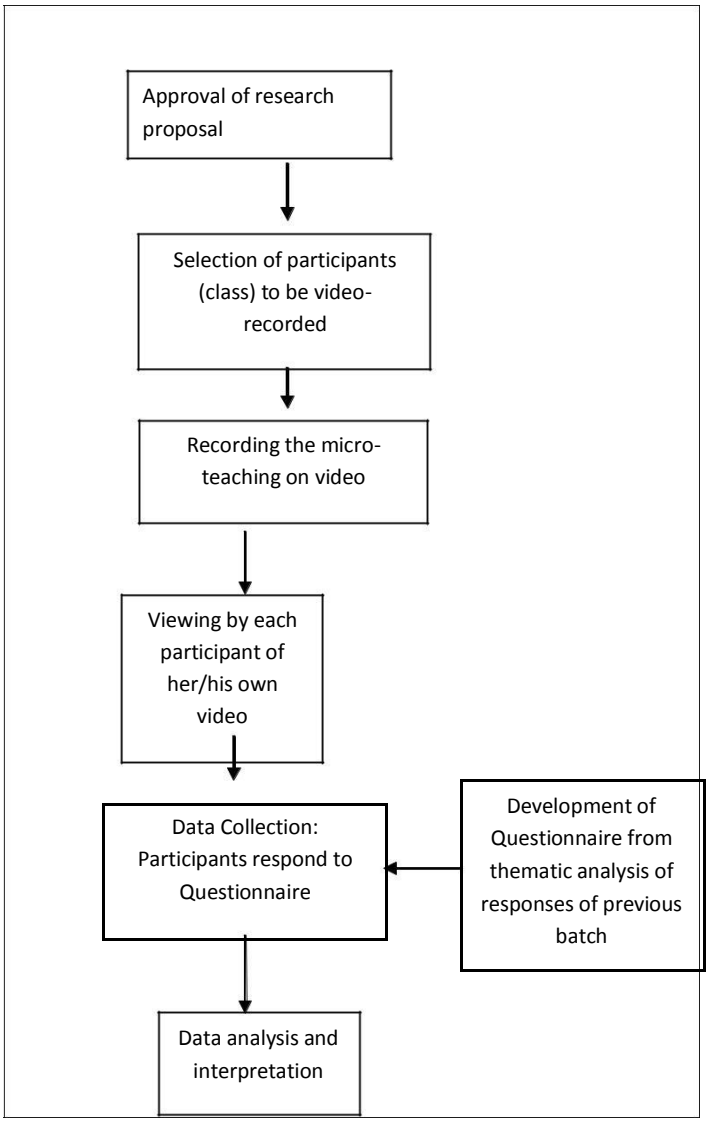

Figure 2. Flow of the study

RESULTS AND DISCUSSION

Perceived extent to which the video of micro-teaching can be beneficial to the micro-teacher in general

In relation to the usefulness of the video, Table 1 shows that all of the items were perceived by the pre-service teachers to apply to them to a high extent. This indicates that, they felt that having a video of their micro-teaching benefited them, especially in helping them identify things to reflect on (Rank 1). These results were consistent with literature on the usefulness of video for self-feedback (*e.g.* Can, 2009; Guo, 2009; Nhu and Thuy, n.d.) and on being a permanent and objective record (Orlova, 2009; Nhu and Thuy, n.d.), that can be viewed repeatedly (Donnely and Fitzmaurice, 2011). They are also consistent with results that micro-teaching can be beneficial in identifying weaknesses and strengths, in line with the claims of micro-teaching literature (*e.g.* Igwe *et al.*, 2013; He and Yan, 2011; Ismail, 2011). These results indicate that video-recording can trigger or enhance reflective practice.

Table 1. General benefits of video-recording

The video-record of my micro-teaching can:	Ave	Description	Rank
help me identify things that I can reflect on (what I have done, what I need to do)	2.94	H	1
serve as a permanent record of my micro-teaching;	2.89	H	2.5
can show weaknesses or mistakes;	2.89	H	2.5
be used as basis for comparison later, after I have graduated;	2.81	H	5
be replayed;	2.81	H	5
can show strengths;	2.81	H	5
serve as a souvenir and	2.56	H	7.5
aid my recall of what had transpired.	2.56	H	7.5

Perceived extent to which the video of micro-teaching can be beneficial to the micro-teacher's teaching practice

Table 2 shows that, in relation to practice teaching, all of the items were perceived to be beneficial to a high extent by the pre-service teachers. The participants perceived that having a video of their micro-teaching was useful in providing feedback regarding specific actions as a teacher.

The results are consistent with those in the previous section on the general benefits of video-recording, indicating that video-recording enhances reflection, as others have also claimed (*e.g.* Can, 2009; Dweikat, n.d.; Nhu and Thuy, n.d.). This enhancement becomes more significant because the things that are reflected upon also impinge on PCK. For example, reflecting on "the organization of my lesson" involves the PCK aspects of 'knowledge of curricula', 'knowledge of successful instructional strategies' and 'knowledge of assessment'. As another example, reflecting on "response or reactions of my students" involves the PCK aspect of 'knowledge of student prior to understanding potential difficulties of students'.

The result on time management (Rank 2), which parallels those of Palupi's (2011) study, indicates that time management needs to be given attention when preparing student-teachers for their real teaching practice in schools. This can also be applicable for all the other items.

Generally, results shown in Tables 1 and 2 indicate that it is advantageous to video-record micro-teaching sessions for subsequent use by the micro-teachers themselves. This utilization can lead to the improvement of pedagogical content knowledge and the enhancement of reflective practice. As a step higher, it might be a good idea for teaching departments to video-

Table 2. Benefits of video-recording, in relation to the act of teaching

The video-record can show areas needing improvement such as:	Ave	Description	Rank
the organization of my lesson;	3.00	H	1
time management;	2.94	H	2
smoothness of flow of the lesson;	2.89	H	4
delivery of the lesson;	2.89	H	4
presence of mannerisms;	2.89	H	4
clarity of my voice;	2.88	H	6
self-control;	2.81	H	7
response or reactions of my students;	2.80	H	8
loudness of my voice;	2.75	H	9
grammar;	2.69	H	12
how I speak;	2.69	H	12
presence of distracting actions (*e.g.*, looking often at notes or lesson plan);	2.69	H	12
facial expression;	2.69	H	12
what my students were doing;	2.69	H	12
how I pronounce words;	2.63	H	15.5
the way I stand in front of the class;	2.63	H	15.5
the way I look and	2.60	H	17.5
perceptions of my students on me.	2.60	H	17.5

record the teaching activities of their students, for viewing by the students themselves; more so, all teachers should see a video of their own teaching for their self-improvement. Outstanding teachers might also video-record their lectures as audio-visual materials and resources for other teachers (Reviewer, personal communication).

Perceived extent to which the video of micro-teaching can be disadvantageous to the micro-teacher, as a permanent record

The items herein were perceived by the pre-service teachers to apply to them to a moderate or low extent (Table 3). This means that the teachers did not feel that having a video of their micro-teaching was disadvantageous, in terms of the possibility of unauthorized viewing and of being a permanent record of errors and mistakes. One reason could be that, because taking photographs and videos of one's self these days have become a common place due to the accessibility of technology (Reviewer, personal communication), participants no longer felt apprehensive about the security of their micro-teaching video; for them, it might be 'just another video'. In addition, participants might have healthy self-concepts, making them accept the reality that all persons commit errors or mistakes and that these can be acted upon especially if they are about things (*e.g.* PCK) that can be changed or improved.

Perceived extent to which the action of being video-recorded can impinge on the micro-teacher

All the items were perceived by the pre-service teachers to be applicable to them to a High extent (Table 4). It can be gleaned that, instead of being debilitated by anxiety or worry (felt to a moderate extent, please refer to Table 5), the micro-teachers had the ability to turn a negative feeling and use the video-recording to their advantage. Another is that, the micro-teacher herself/himself can establish the right classroom atmosphere, lessening the burden on the subject teacher who has this responsibility, following the ideas of Donnely and Fizmaurice (2011).

Table 3. Drawbacks of having a video of micro-teaching

Having a video-record of my micro-teaching is disadvantageous because it:	Ave	Description	Rank
might be seen by other people, without my authorization and	1.87	M	1
will be a permanent record of all my errors and mistakes.	1.44	L	2

Table 4. Effect of video-recording on micro-teacher

Being video-recorded during micro-teaching:	Ave	Description	Rank
can give me an opportunity to exercise control of my nervousness or self-consciousness,	2.73	H	1.5
provides me an opportunity to make an effort to lessen the nervousness or self-consciousness of my students,	2.73	H	1.5
can help me learn to ignore the camera and	2.63	H	3
can remind me to be formal.	2.51	H	4

Table 5. Effect of video-recording on classroom interactions

Being video-recorded During micro-teaching:	Ave	Description	Rank
limits teacher-student interactions,	1.73	M	1.5
makes my students nervous or self-conscious,	1.73	M	1.5
makes me uncomfortable because I feel being watched by an unavoidable eye,	1.71	M	3.0
makes me nervous or conscious leading to less efficiency (*e.g*. committing mistakes, forgetting things, *etc*.) and	1.67	M	4.0
makes my mannerisms evident.	1.53	M	5.0

Perceived extent to which the action of being video-recorded can impinge on classroom interactions

All the items were perceived by the pre-service teachers to apply to them to a Moderate extent (Table 5). These results, coupled with those from Table 3 and 4, indicate that the perceived positive effects of being video-recorded do outweigh the perceived negative effects.

Perceived extent to which the thought that micro-teaching will be video-recorded will elicit nervousness

In relation to eliciting nervousness, Table 6 shows that the items were perceived by the pre-service teachers to apply to them to a Moderate or Low extent. These results are consistent with that of Donnelly and Fitzmaurice (2011) that participants initially experienced anxiety. Thus, it appears that things have to be done by the micro-teacher and/ or by the subject teacher in order to reduce this anxiety, worry or nervousness.

Perceived extent of what should be done by the subject teacher to reduce worry or anxiety that are video-recording-related

Most of the items on what the subject teacher should do were perceived by the pre-service teachers to apply to them to a high extent (Table 7). The pre-service teachers agreed that their teacher can alleviate their anxiety by informing them ahead of the video-recording and giving instructions. This result is in line with the assertion of Donnelly and Fitzmaurice (2011) that the teacher should establish the right climate so that micro-teachers will not feel uncomfortable in relation to being video-recorded.

Perceived extent of what should be done by the micro-teacher in order to reduce worry or anxiety that are video-recording-related

In relation to the action of the micro-teacher to reduce worry or anxiety, most of the items were perceived by the pre-service teachers to apply to them to a High extent (Table 8). The participants

Table 6. Feelings about being video-recorded, at the outset

When informed that my micro-teaching will be video-recorded:	Ave	Description	Rank
I felt nervous but excited,	2.46	M	1
I felt excited and	2.33	M	2
I felt nervous	1.46	L	3

Table 7. Things that the teacher should do to alleviate worry or anxiety

In order to reduce the worry or anxiety of the micro-teacher, the subject teacher should:	Ave	Description	Rank
Inform the student that the micro-teaching will be video-recorded	2.89	H	2
Give proper instructions before the actual video recording [*e.g.*, do not look at camera; pretend that there is no camera, ...]	2.89	H	2
Give students time to prepare	2.89	H	2
tell the students that the video-record will be confidential	2.81	H	4
tell the students about the advantages and disadvantages of recording the micro-teaching on video	2.75	H	5.5
Show a sample of a video-recorded micro-teaching to students	2.75	H	5.5
Give rubric	2.69	H	7
Be a model for the video-recording of micro-teaching	2.67	H	8
Let students select their own topic and strategy	2.31	M	9
use hidden camera	1.92	M	10
not inform that students that video-recording will be done	1.40	L	11

Table 8. Things that the micro-teacher should do to alleviate worry or anxiety

In order to reduce her/his worry or anxiety, the micro-teacher should:	Ave	Description	Rank
Plan and prepare for the micro-teaching	2.94	H	1
Rehearse the micro-teaching before the actual teaching	2.81	H	2.5
Be optimistic	2.81	H	2.5
Plan to ignore the camera	2.60	H	4

agreed that they can alleviate their own anxiety by planning and preparing and rehearsing. This result shows that the micro-teachers recognized that they had the power to act on their worries.

Relationship between perception and micro-teaching grade

Results for the relationship between perception and micro-teaching grade are shown in Table 9. Scores 1–8 involved the totals of the 'extent' for the items shown in Tables 1–8. For example, Score 1 is the total of the 'extents' for the items in Table 1, and so on.

A significant negative relationship was noted between the average grade given by the peer-observers and Score 5, which involves drawbacks of being under a video camera during micro-teaching. This means that the higher the grade given to micro-teacher, the lesser the perceived extent of disadvantages being video-recorded in relation to limiting classroom interactions and self-consciousness. Although this relationship does not involve 'cause-and-effect', it can indicate that micro-teachers who perceived video-recording as non-threatening obtained higher grades (or performed better), following the ideas of Donnelly and Fitzmaurice (2011). If this were true, then the subject teacher really had to make sure that micro-teachers and their micro-students were comfortable so that the technique can lead to an improved performance.

Table 9. Relationship between perception (Tables 1-8) and micro-teaching grade

	Score 1 (prob)	Score 2 (prob)	Score 3 (prob)	Score 4 (prob)	Score 5 (prob)	Score 6 (prob)	Score 7 (prob)	Score 8 (prob)
Grade of micro-teaching from teacher	.34 (.20)	.30 (.26)	-.08 (.78)	.09 (.75)	.34 (.20)	.16 (.55)	.31 (.24)	.07 (.58)
Average grade from peer-observers (classmates)	-.08 (.76)	-.04 (.89)	-.04 (.89)	.02 (.95)	-.49 (.05)	-.20 (.47)	-.23 (.40)	.05 (.86)

CONCLUSIONS AND RECOMMENDATIONS

As a whole, results indicate that the positive effects of the video-recording of the micro-teaching of pre-service physical science teachers far outweigh the negative effects. The combination of micro-teaching and video-recording can assist in student development along pedagogical content knowledge and along reflective practice.

It is recommended that teachers use video-recording of micro-teaching in physical science subjects that involve teaching strategies. At the institutional level, the University may consider the formulation of a policy that requires the use of video-recording to supplement micro-teaching where teaching strategies are involved. Further studies on other teaching degree programs (*e.g.* Bachelor in Elementary Education, Bachelor of Science in Home Economics, …) and other majors (*e.g.* Biological Science, English, …) can be conducted to confirm or negate the results of this study.

CONFLICT OF INTEREST

The authors hereby declare that there are no known conflicts of interest associated with the publication; the manuscript has been read and approved by all authors and there are no other persons who satisfied the criteria for authorship; and there are no impediments to publication of this work.

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