

Student Views of a Life Sciences Methodology Module Offered at a Distance Institution

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ABSTRACT The question whether it is possible to train teachers at a distance, is not new and its efficacy has been questioned on numerous occasions. As education at a distance is often viewed as education in isolation, this pedagogy is questioned, particularly where the mastery of particular skills and competences are concerned. The crux of the issue is based on the very nature of teaching and in particular of Life Sciences, which encompasses practical skills and competencies that can usually only be acquired through onsite interactive communication. The lack of physical contact between lecturers and students, and limited opportunities to develop process skills all contribute to challenges for this pedagogy. In an attempt to determine to what extent a particular module offered at a distance, does prepare prospective Life Sciences teachers for their task, a survey was undertaken on a cohort of students who had successfully completed the module. This paper reports on this study and identifies possible limitations to the efficacy of teacher training. Suggestions are made about how these can be addressed in the module to improve Life Sciences teacher training with the focus on open and distance electronic learning.

INTRODUCTION

The question whether it is possible to train pre-service teachers at a distance, has been raised by several researchers (Chakwera and Saiti *sa*; Mashile 2008). Education at a distance is often viewed as education in isolation and because teaching is a social activity, queries are raised about the suitability and appropriateness of this mode of teaching and learning for teacher training. This argument is based on the very nature of teaching, which encompasses practical skills and competencies that can only be acquired within a community of practice through interactive communication. The lack of physical contact between lecturers and students, the absence of a shared space and limited prospects for alternative supporting learning contexts, all contribute to challenges for pedagogy (Gillies 2008). Yet, distance education is becoming a permanent feature of higher education (Norton and Hathaway 2008) and with technological advances and the development of open and distance electronic learning (ODEL), this pedagogy will play an increasingly important role to address the dire need for qualified and competent school teachers (Banks et al. 2009; Mashile 2008; Sampson 2009). The question arises whether ODEL is effective for Life Science teacher education and whether it can contribute to good teaching of the school subject. What, however, is good teaching?

The interpretation of “good teaching” is based on what best meets the needs of the prospective teacher’s situation, such as group dynamics, learning needs and the school environment, and what is needed for each particular circumstance (Kumaravadivelu 2006). The result should be that the novice teacher is able to slot into teaching and the actual classroom environment with ease. Can this be done at a distance and can the subject methodology of Life Sciences equip teachers to do so?

CONTEXTUALISATION

In an attempt to answer the preceding question, the Life Sciences teacher training offered at the University of South Africa (Unisa) was examined. Prospective Life Sciences teachers have two options: They can either register for the Bachelor of Education degree or after completing a Bachelor of Science degree, register for the Postgraduate Certificate in Education, which is offered at a distance over a period of two years. The subject methodology for Life Sciences is offered in both programmes and forms the focal point of this investigation. Unisa is moving from a correspondence type of distance education using paper-based tuition to ODEL and is currently on the third phase of open and distance learning as identified by Tatkovic et al. (2006). This implies that the institution makes use of a combination of one-way and

multi-link communication, such as written material, video conferencing, telephony, e-mail, internet and a web-based platform, known as *myUnisa* to communicate with students. The intention is to move to a totally online pedagogy to facilitate synchronous tuition. However, as Norton and Hathaway (2008: 476) state: "If online learning is to rise to the level of its promise, it is necessary to create a pedagogical model or models that enable educators to capitalize on the potentials afforded by online learning technologies. A bold new view of learning and schooling is needed – one that is not only research-based but research-validated. It must be credible and validate human experience while stretching current understanding". This could be ideal to train Life Sciences teachers, but student numbers could hamper the efficacy of this pedagogy. Student numbers for the methodology of Life Sciences have on average increased steadily from 149 in 2008 to 246 in 2013. These students may have completed their degree majoring in Botany and/or Zoology or should be in the process of doing so while doing the methodology module and should consequently have mastered the required science process skills that should be taught in Life Sciences. These process skills are the tools scientists use to investigate the world around them. If prospective teachers have not mastered these skills, then the subject methodology needs to facilitate the development and acquisition of teaching skills and competences for "good teaching" that will enable novice teachers to teach the required process skills in the classroom. This leads to the formulation of the research question: Does the methodology module offered at Unisa succeed in preparing Life Sciences teachers for their task and what are students' experiences in this?

In an attempt to get answers to these questions, a quantitative survey was undertaken using questionnaires with closed and open-ended questions. The closed questions consisted of eleven statements and used a four-point Likert scale to ensure that a definite positive or negative response is obtained. These statements appear in the table reporting the findings.

The open-ended questions were the following:

- ♦ What in the Life Sciences methodology module prepared you for the classroom situation?

- ♦ What do you think should be included in the module that would have made your task as a new Life Sciences teacher easier?
- ♦ Make suggestions to improve the Life Sciences methodology module at Unisa so that it would better prepare future students.

Sample selection was purposive. Grinnell and Unrau (2008) indicate that purposive sampling is based on the judgement of the researcher, but the sample has to consist of participants that have the most representative or typical attributes of the population under study. In this investigation the sample consisted of all students who were registered and successfully completed the Life Sciences methodology module in 2009 (n=148). The questionnaires were mailed to students in February 2011. The reason for sending the questionnaires a year after students had completed their training was to get their input about efficacy of the module and their experiences of practice. A 62.2% return of responses was received via mail. Students submitted their questionnaires anonymously and as the questionnaires were unmarked there was no way to trace who had submitted them.

FINDINGS AND DISCUSSION

Table 1 summarises the results of the selections of the respondents and presents the frequency of the four judgements as made by the respondents.

The majority of the respondents (88%) raised concerns about their preparedness for the classroom situation with a mere 12.0% indicating that the methodology module actually prepared them for their daily teaching task, however the majority (76.1%) indicated that there was adequate focus on how to teach science process skills. There is a study unit in the guide that covers process skills and how to teach them, which may be the reason for this response.

Most of the respondents were of the opinion that the subject methodology contained too much theory (78.2%) and was not pragmatic enough (65.2%). Most (64.1%) indicated that they did not use what they had learnt in the module to teach Life Sciences. A small majority (56.5%) also indicated that they did not focus on the development of process skills in their teaching. This corresponds with their responses on whether they teach the way they were taught where over 80% indicated that they do

Table 1: Frequency of judgments made by respondents

<i>Statement</i>	<i>Strongly disagree</i>	<i>Disagree (n) %</i>	<i>Agree (n) %</i>	<i>Strongly agree(n) %</i>
• The module prepared me for my daily teaching task	(43) 46.7	(38) 41.3	(7) 7.6	(4) 4.4
• There is adequate focus in the module on how to teach process skills	(8) 8.7	(14) 15.2	(47) 51.1	(23) 25.0
• I think the module has too much theory	(9) 9.8	(11) 12.0	(39) 42.4	(33) 35.8
• To me the content in the guide is practical and useful	(36) 39.1	(24) 26.1	(14) 15.2	(18) 19.6
• I use what I learnt in the module to teach Life Sciences	(23) 25.0	(36) 39.1	(25) 27.2	(8) 8.7
• I focus on including process skill development in my teaching	(19) 20.6	(33) 35.9	(31) 33.7	(9) 9.8
• There are enough practical lessons in the school timetable to develop learners' process skills	(18) 19.6	(46) 50.0	(21) 22.8	(7) 7.6
• I teach the same way I was taught	(5) 5.4	(12) 13.0	(43) 46.7	(32) 34.8
• I try out new teaching strategies when I can	(39) 42.4	(40) 43.5	(11) 11.9	(2) 2.2
• I get support from experienced teachers at my school	(3) 3.3	(6) 6.5	(42) 45.6	(41) 44.
• Older teachers are willing to try new ideas	(46) 50.0	(21) 22.8	(20) 21.7	6(5) 5.4

and only 14.1% indicated that they try out new teaching strategies when they get the opportunity.

Even though the novice teachers are familiar with process skills, they do not necessarily focus on the development of these and resort to teaching the way they were taught, possibly with the focus on completing the syllabus. The majority (69.6%) indicated that they do not have enough time in the school timetable for practical work and the development of process skills, which exacerbates the situation. Although the majority (90.2%) of the novice teachers responded that they get support from experienced teachers, 72.8% also indicated that most of the older teachers are not willing to try new ideas.

The open-ended questions provided some clarity. The responses to what in the Life Sciences methodology module prepared them for in the classroom situation were generic. There seemed to be agreement about the contribution of the methodology module such as learning about new teaching methods and techniques particularly "...using brainstorming exercises and those that involve learners more such as cooperative learning and group work".

"I acquired skills that are of good use in my teaching career such as cooperative learning skills, assessment strategies, critical thinking, positive reinforcement, how to facilitate active learning and as a teacher to be a lifelong learner."

The selection of teaching methods was mentioned but was linked to pedagogical content knowledge:

"You need to know your content...you can't just read from a book and go and teach a class. Learners expect new knowledge and an understandable explanation of the work and one should be able to do that".

"The learners really don't expect you to tell them what they can read in the textbook – they want to know what else you know that is not in the textbook – that is my experience".

"The module gave information in things such as lesson plans, assessment skills and the like that are very important, but one really learns when you are actually teaching. You get an idea of what to expect when you study, but once you are teaching full-time, then you really learn".

The use of teaching media and aids to facilitate learning was also mentioned.

"You don't really know what to use to explain content if the school is poor. You need to get ideas on how to improvise and I learned how to use familiar things as teaching resources because our school has few resources".

"I learned how to do reflection with learners because then you find out that they actually tell you how they want to learn".

"It is important to use different teaching methods and variations to emphasise certain points and create a positive climate, because

that stimulates active learning, which is crucial."

"I have learnt that, when assessing learners, one has to balance the questions in order to allow the learners to practise how to respond."

As far as what should be included in the module, responses varied but a number of respondents indicated that they struggled with maintaining discipline in their classrooms and that the methodology module did not assist them with this, nor with how to deal with learners that experience barriers to learning. The main focus of responses was on how to work with learners who are at various developmental levels.

"I wish to learn more on child development and how we as teachers can help in their learning."

"It's not that I didn't master this, but I feel that the module didn't focus on the learner, how to approach different learners and with what teaching methods."

"I would have loved to have learned how to help children who are slow to grasp basic concepts and who are falling behind the pace of work that the other learners are working at. Often there is little or no parent involvement and parents do not know how to help their children."

"I would like to have a better understanding of learners' capability of learning and then to choose a teaching method that will help them."

"I would have liked a lot more input on how to support learners with special needs and how second language learners learn best."

Numerous suggestions were provided on what could be done to improve the methodology module. Some proposed that arrangements be made to have their practice lessons video-recorded for reflection and to develop self-reliance. Alternative technologies should be made available for methodology students, for example *"...where students do not have computer access multipurpose media players should be provided."*

"Technology should be provided to make it possible for students to download podcasts and video-clips of particular teaching skills and practical sessions using myUnisa."

"We could have been asked to download a short section of our teaching during the teaching practice lesson and share these with each other."

The recommendation that students be provided with DVDs containing examples of good Life Sciences teaching was encountered frequently. The DVDs should be accompanied by discussions of the teaching scenarios pointing out which skills are used and why they are considered appropriate for good teaching. An interesting suggestion was that *"...it would be a good idea to be mentored electronically by experienced teachers"*. To facilitate this, Unisa should develop a network between students, lecturers and good teachers *"...even if it is in the form of a contract. This way everyone will know what is expected during teaching practice."* Everyone should be encouraged to interact because in the long term the intention is to improve teaching.

"There should also be more opportunities for students to observe good teachers so that they can model their teaching. Not all the teachers we had at school were good, so it would be nice to see how it could be done well."

RECOMMENDATIONS

When novice teachers are in practice, it appears as though they have to conform to what the school environment expects from them, which often differs from their pre-service training. The findings of this investigation reiterate this as the majority of the respondents indicated that they do not try out new teaching strategies when they can. If the argument is accepted that teaching is primarily learned on the job, the concern can be raised that as many serving teachers are viewed as relatively ineffective, the fact that they still serve as models and mentors for novice teachers, perpetuates a cycle of mediocrity. In addition there appears to be a gap between what is offered in teacher training programs and what happens in schools. The fact that Life Sciences teachers are encouraged to develop their learners' process skills and that this is not done due to time constraints and teaching as they were taught, has vast implications for ODeL teacher training, where the training of teachers is dependent on field placements and on the assumption that mentor teachers have the expertise to prepare and guide prospective teachers to teach in diverse settings. Teacher education should therefore develop a more productive relationship to improve practice. The eventual aim therefore should be the closing of the gap between

preparation and practice. There should be a strong emphasis on individual support by trained school-based staff that serves as mentors or tutors for trainee teachers. Good teacher training through ODeL requires close contact between trainees and tutors (or school mentors) in order to provide focused observation and coaching to improve teaching. This shifts the ODeL model toward face-to-face school-based support models or to enhanced ICT models of support that may increase expenses. Irrespective of the cost factor, tutors or mentors could be the key to successful Life Sciences teacher training. The challenge though is determining how ODeL can use the potential of teaching and learning in a school-based setting alongside the assimilation of ideas presented in the module to develop the novice teacher's professional thinking, skills, and practice. At the heart of this lies the training of school-based mentors who are able to assess whether trainee teachers are able to apply what they have learnt in a practical context.

CONCLUDING REMARKS

Though there appear to be some challenges for teacher training through ODeL, it remains an ideal means to increase the number of competent and qualified Life Science teachers needed to improve the teaching and learning of the subject. By implementing the identified actions, the alleged gap between theory and practice may be narrowed and could lead to improved teaching and learning in all schools.

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