

Increasing the Effectiveness of the On-Job-Training for Physics Teachers in Saudi Arabia

Yousef Alhaggass

Abstract—It is widely known that the quality of teachers' performance is a vital component of any educational system. Therefore, this study aims to address the issue of professional development of physics teachers in Saudi Arabia by reviewing the preferred on the job training activities of their in-service training in terms of meeting their training needs and consequently assisting them to teach physics topics effectively. The research reviews data from a relevant sample ($N=62$) of physics teachers at secondary and intermediate schools in the city of Onaizah, Saudi Arabia. The results have shown that many participants made clear statements about the limit positive impact on their performance as a result of on-the-job training activities by physics supervisor. Furthermore, in order to increase the effectiveness of professional learning for physics teachers, some suggestions have been given by many participants. These suggestions included the improvement of the professional learning activities, teachers' motivation, professional learning materials and resources.

Index Terms—In-service teacher education, Andragogy.

I. INTRODUCTION

Teachers' professional development is a vital component of any educational system. Therefore, the policy of education in addition to the legislation of civil service in Saudi Arabia confirmed that training of teachers is a continuous process and considered as a part of their jobs both during work hours and out of work hours. The Ten-Year Plan of the Ministry of Education also included the improvement of male and female teachers' quality [1].

Although there is a large number of professional development activities for teachers, students' achievement in physics are not satisfied according to the Department of Educational Supervision [2]. Poor practice of physics education is still dominated in schools and consequently, the desired outcomes of learning physics are not achieved properly.

This situation generated the need to evaluate the effectiveness of the actual professional development practices as a first step to identifying improvement strategies for physics teachers, and ultimately improve outcomes for students.

II. LITERATURE REVIEW

As an important field of science, physics is needed to be taught using effective approaches such as investigation

activities. However, in spite of the importance of such methods on assisting students to learn physics concepts properly, many teachers are not often use them during physics classes which might occur because of two main reasons. Firstly, the lack qualification of physics teachers plays an essential role in this area as some researchers argued. For instance, in order to evaluate pre-service physics teachers' qualifications a study conducted by Eryilmaz and İlaslan [3] on fifty pre-service physics teachers from four universities in turkey. The results showed that pre-service physics teachers had not sufficient knowledge on subject matter, teaching methods, measurements and evaluations and classroom management. Consequently, many specialist organization suggested standards to be considered in teachers' preparation programs to assist them to teach physics efficiently. National Science Teachers Association NSTA [4] for example recommended 26 standards for teachers of physics covering three areas of competencies; core, advanced and supporting. However, unproductive teaching methods still widespread in many physics learning situations, which might refer to the neglect of such standards in many preparation programs of physics teachers.

Secondly, in many cases, teachers might be required to teach outside their specialist areas and as a result science is taught by non-specialist teachers. For instance, in a study from Newcastle-upon-Tyne in the United Kingdom, 38% of all mathematics education and 22% of physics lessons in the 11-16 age range were run by inappropriately qualified teachers [5]. Such problems might occur due to the shortages of qualified teachers or due to curriculum reorganization [6]. Therefore, learning physics is more likely to be affected negatively when physics classes are run by unqualified teacher who might have different capability to the qualified teacher [7].

As a result, more effective in-service training programs are required to be available for all physics teachers in general and non-specialists physics teachers in particular in order to help them to teach physics teachers efficiently.

Although different teaching models and instructional techniques such as expository, interactive, individualization and models of reality are broadly used in educational institutions [8], there is no one of them is accepted as the only proper method of instruction because using the same method of instruction all the time can build a barrier to learning [9]. Hence, it is important to use the most appropriate training methods for every learning situation.

There are some factors to be considered in the selection of the most effective training methods. Firstly, the training methods should be selected based on the learners' requirement rather than what the trainer feels like doing [9]

Manuscript received May 20, 2014; revised July 26, 2014.
Yousef Alhaggass is with Victoria University, Melbourne, CO 3073 Australia (e-mail: haggass@yahoo.com).

and because the nature of teaching adults (Andragogy) differs from the (Pedagogy) which refers to the teaching of younger learners [10], adult learning principles should be considered when choosing training methods. Such principles which are known as six assumptions have been stated by Knowles, Holton, and Swanson [11].

Secondly, the nature of training topics is dissimilar and

thus the trainer should not rely on an only method of instruction for all subjects [9]. Training programs outcomes therefore, should be considered when selecting instruction methods as ranking by Townsend [12] depending on instruction goals (1 = high and 8 = low) in the following matrix:

TABLE I: EFFECTIVENESS OF DIFFERENT TRAINING METHODS BASED ON INSTRUCTION GOALS

METHOD	Knowledge Acquisition	Attitude Change	Problem solving Skills	Inter-personal Skills	Participant Acceptance	Knowledge Retention
Lecture	8	7	7	8	7	3
Case study	4	5	1	5	1	4
Workshop	1	3	4	4	5	2
Games	5	4	2	3	2	7
Films	6	6	8	6	4	5
Programmed instr.	3	8	6	7	8	1
Role-playing	2	2	3	1	3	6
T' group	7	1	5	2	6	8

Adapted from: Townsend (2003)

Thirdly, in general, when considering the subject matter, training should aim at the ‘must know’ area as priority as Kroehnert [9] affirmed.

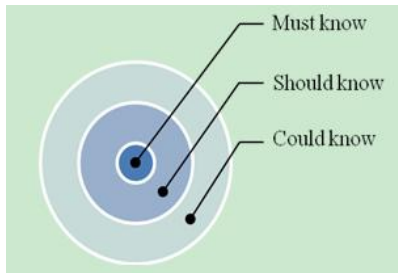


Fig. 1. Learners' learning priority [9].

Consequently, during the in-service training programs, focus should be on practical learning because dealing with theoretical principles is less advantageous as the results of physics teachers survey carried out by Jauhiainen [13] showed.

Lastly, making the decision on what learning activities should be used is also affected by the length of training program duration as well as available facilities and learning materials. For example, while complex case studies and games (as professional learning activities) consume a longer time for both preparation and implementation in addition to needing more materials and facilities [14], expository training such as lecture and oral presentation on the other hand can be used for short duration training courses due to the low consumption of time and low cost of materials.

III. METHODS

The research design employed in this study is mixed methodology approach which is a commonly used technique in educational research [15] and deemed as the most appropriate research design for this study because it is able to collect both the qualitative and quantitative data needed to identify the effectiveness of professional learning for physics teachers. Moreover, a mixed method accommodates information coming from respondents that is very difficult to quantify, such as reasons, opinions and comments [16].

The research reviews data from a relevant sample ($N=62$)

of physics teachers at secondary and intermediate boy schools in the city of Onaizah, Saudi Arabia.

Written survey research was used in the study to determine Teachers' experiences of the effectiveness of their in-service professional learning activities.

A questionnaire adapted from “Teachers' in-service training needs in Cyprus” [17] has been used in this study. The questionnaire consists of two main parts as follows:

Part 1: Demographic characteristics. This includes some basic information in two sections:

Section A: about the teacher himself; age, total number of years in teaching, qualification, major and previous professional learning activities he involved in.

Section B: about his school; type of school building and number of classes.

Part 2: Teachers' experiences of the effectiveness of their professional learning activities. This includes: expository training, interactive training and model physics lessons.

As well as open-ended questions, closed questions have been used so that teachers respond through the indication of the extent to which they agreed with specific statements on a Likert-type scale (from 1 to 5, with 1 indicating strong agreement and 5 strong disagreements).

Furthermore, In order to assess the appropriateness of the data collection tools, a pilot study should be considered [15]. Therefore, the questionnaire has been tried out with a small sample of physics teachers.

In addition, because a deep understanding on professional learning of physics teachers is needed, some interviews have been conducted after the written survey research have been completed.

The interview questions were prepared based on the teachers' responses to the questionnaire in order to explore the individual's perspective and recommendations relating to the professional learning activities of physics teachers.

IV. FINDINGS

Teachers who responded to this survey were asked to identify their personal opinions on the most helpful activities for their in-service professional learning. Table I presents the

results derived from the statistical analysis of teachers' responses to the questionnaires.

TABLE II: PROFESSIONAL LEARNING ACTIVITIES

Professional learning activates	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Expository training (lecture, demonstrations ... etc) would be most helpful for Professional learning activates	16.7%	21%	25%	24%	13.3%
Interactive training (workshops, group discussions ... etc) would be most helpful for Professional learning activates	22.6%	56.5%	16.1%	4.8%	0%
Model physics lessons would be most helpful for Professional learning activates	32.3%	43.5%	14.5%	9.7%	0%

Table II shows that (37.7%) of teachers accepted the expository training as the most helpful technique for their professional learning while (37.3%) of them declared the weakness of such technique to be used in teachers training programs. Uncertainty on the contrary, has been declared by the quarter (25%) of respondents.

Furthermore, in the area of Interactive training, the majority (79.1%) of teachers stated that this type of training activities would be most helpful way to learn professionally. However, uncertainty has been declared by (16.1%) of respondents.

In addition, regarding to the model physics lessons, approximately three-quarter (75.8%) of teachers preferred such lessons to be a part of their professional learning programs.

In addition, interviewees in this study were asked to identify their personal opinions on the quality of the on-the-job professional learning activities for physics teachers within their schools. All participants agreed that supervision activities are quick procedures and implemented as an inspection process rather than an improvement process for physics teachers' performances. Consequently, physics teachers might not improve their teaching skills effectively unless implementing this form of on-the-job training according to the step-by-step job instruction technique which presented by Dessler [18]; preparation of the trainee, presentation of the operation, performance tryout and follow-up. This has been supported by some comments such as:

"I receive some fast notes during the visit of physics supervisor"

"It is rare that the supervisor provides teachers with new skills and methods due to the short visit to school by the supervisor"

V. DISCUSSION

The teachers preference (79.1%) recorded regarding to the interactive training, is not surprising due to the advantages of

such model. For example, the role of learner within this model is to participate with training activities effectively in order to accomplish the task [8] and thus:

- Teachers are more active
- Many skills are learnt
- Teachers can share knowledge and learn from each other (cooperatively)
- Teachers receive immediate feedback

As a result, physics teachers are more likely to learn professionally well using this type of interactive training activities. This has been supported by open comments such as:

"Using small groups in training programs is excellent"

In addition, the preference found (75.8%) regarding to the model physics lessons is an expected result due to the advantages of this practical technique. Such finding supports the notion that during the in-service training programs, focus should be on practical learning rather than theoretical learning because of the fact that dealing with theoretical principles is less advantageous stated by many researchers such as Townsend [12] and Jauhiainen [13].

Consequently, by the use of this interactive form of training, physics teachers are more likely to improve their teaching skills effectively.

- 1) Furthermore, in order to increase the effectiveness of professional learning for physics teachers, some suggestions have been given by many participants. These suggestions included the improvement of the professional learning activities, teachers' motivation, professional learning materials and resources as follows:
- 2) "Obviously, it is important to organize effective meeting for physics teachers in order to assist them to exchange experiences. Personally, I think such frequently meeting is useful. So, I hope it run twice a semester"
- 3) "in order to help physics teachers to improve their performances, exchanging visits among them within their schools should be planned well and scheduled well"
- 4) "Well, it can increase the effectiveness of professional learning for physics teachers by inviting experts in science education in addition to providing teachers with well designed learning materials such as DVDs"
- 5) "The effectiveness of professional learning for physics teachers can be increased by providing the teacher with new practical ideas follows by instant demonstration by the supervisor in physics classroom"
- 6) "Motivating physics teachers to do research is useful idea"
- 7) "Schools principals should be trained in order to assist in the improvement of physics teachers within their schools"
- 8) "Also, it is important to motivate and assist physics teachers to participate in professional learning activates"
- 9) "Well, I think it is possible to apply some reasonable incentives in order to encourage physics teachers to participate in different type of professional learning activities"
- 10) "I think that a specialist educational library should be established in each school. Such library should be

provided with useful professional learning materials for teachers”

- 11) “What is problem to use the most skilful teacher to be a supervisor for other teachers in the same area within their school? I think it is a useful and practical idea”
- 12) “The effectiveness of professional learning for physics teachers can be increased by implementing some training programs (by a trainer from educational training centre) within school day in order to improve a large number of teachers instead of improving one teacher”

VI. CONCLUSION

This study aims to investigate the most helpful in-service training activities of physics teachers in Saudi Arabia in terms of meeting their training needs and consequently assisting them to teach physics topics effectively. The research reviews data from a relevant sample ($N=62$) of physics teachers at secondary and intermediate schools in the city of *Onaizah*, Saudi Arabia. The results indicated that many participants made clear statements about the limit positive impact on their performance as a result of on-the-job training activities by physics supervisor. Furthermore, in order to increase the effectiveness of professional learning for physics teachers, some suggestions have been given by many participants. These suggestions included the improvement of the professional learning activities, teachers’ motivation, professional learning materials and resources.

REFERENCES

- [1] General Directorate of Planning, “The Executive Summary of The Ministry of Education: Ten-Year Plan 1425-1435 H (2004-2014),” 2nd Ed., Saudi Arabia: Ministry of Education, 2005.
- [2] Department of Educational Supervision, Annual report, Saudi Arabia: Directorate of Education in Onaizah, 2010.
- [3] A. Eryilmaz and H. İlaslan, “Determining and evaluating ideal physics teacher’s characteristics,” *Hacettepeniversitesi Eğitim Fakültesi Dergisi*, vol. 16-17, pp. 53-60, 1999.
- [4] National Science Teachers Association (NSTA), “Standards for science teacher preparation,” USA: National Science Teachers Association, 2003.
- [5] N. Straker, “Teacher shortage in mathematics and physics: Some possible solutions,” *School Leadership & Management*, vol. 8, iss. 2, pp. 229-235, May 1988.

- [6] R. Millar, “Teaching Physics as a non-specialist: The in-service training of science teachers,” *Journal of Education for Teaching*, vol. 14, no. 1, pp. 39-53, 1988.
- [7] F. Lubben, “The convergence of teachers’ and providers’ views on INSET needs: The case of the non-specialist physics teacher in Swaziland,” *International Journal of Educational Development*, vol. 14, no. 1, pp. 43-49, 1994.
- [8] M. Print, *Curriculum Development and Design*, 2nd Ed., St Leonards: Allen & Unwin, 1993.
- [9] G. Kroehner, *Basic Training for Trainers*, 3rd Ed., Australia: McGraw-Hill, 2000.
- [10] A. Rogers, *Teaching Adults*, 2nd Ed., Buckingham: Open University Press, 1996.
- [11] M. Knowles, E. Holton, and R. Swanson, “The adult learner: The definitive classic in adult education and human resources development,” 6th Ed., USA: Elsevier Inc. 2005.
- [12] J. Townsend, *The Trainer’s Pocketbook*, 10th Ed., England: Management Pocketbooks Ltd, 2003.
- [13] J. Jauhainen, “Effects of an in-service training program on physics teachers’ pedagogical content knowledge,” Helsinki: University of Helsinki, 2013.
- [14] R. Stanciu, “Choosing the most appropriate training methods for management training programmes,” *Fascicle of Management and Technological Engineering*, vol. 6, no. 16, 2007.
- [15] D. Ary, L. C. Jacobs, and A. Razavieh, *Introduction to Research in Education* (3rd Ed.), Canada: CBS College publishing, 2006.
- [16] R. Johnson and L. Christensen, *Educational research: Quantitative, Qualitative, and Mixed Approaches* (3rd ed.), Thousand Oaks, CA: Sage, 2008.
- [17] Y. Karagiorgi and L. Symeou, “Teachers’ in-service training needs in Cyprus,” *European Journal of Teacher Education*, vol. 30, no. 2, pp. 175-194, 2007.
- [18] G. Dessler, *Human Resource Management* 8th Ed., USA: Prentice Hall, 2008.

Yousef Saleh Al-Haggass was a physic teacher between 1991 and 1994 at the *Onaizah* secondary school. He was also served as an educational supervisor for science between 1995 and 1999 at the directorate of education in the city of *Onaizah*. He has been an educational trainer since 2006 at the educational training centre in the city of *Onaizah*. He designed, implemented and evaluated many in-service training programs for educators such as teachers, headmasters and educational supervisors. These training programs include teaching methods, cooperative learning, instruction skills, fundamentals of planning, presentation skills and training methods as well as some boy scouts programs. Also, he published many academic papers in some conferences, many written articles in some educational local magazine in addition to some handbooks for boy scouts. Furthermore, he a member of some association such as Saudi Educational and Psychological Association, Saudi Management Association and Saudi Arabian Boy Scouts Association. Now, Yousef is a Ph.D student at Victoria University in Melbourne, Australia. His PhD thesis concerns the area of physics education focusing on the topic of professional learning of physics teachers in Saudi Arabia.