Research trends in ICT and education: A systematic review of continuous professional development courses for online educators

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Abstract. The role of Information Communication Technologies (ICTs) and online courses in Continuous Professional Development (CPD) for educators have remain debatable. A limited number of studies have systematically been reviewed on the growing influence of ICTs and continuous professional development courses for online educators. This paper aims to extract the value and appropriateness of the trends concerning the focus, types, and context of CPD, the goals and tools of research, and the types of data collected. To map the popular trends, methods, and ICT tools used in CPD online courses as a research methodology, researchers performed a systematic literature review of studies written in English and published between January 2015 and January 2019. Inclusion and exclusion principles were employed to identify studies of any ICTs based in CPD design that examine the concept of online professional development courses through the point of view of the design used and to review the impact that ICTs have had on numerous aspects of teaching and learning for educators. Researchers screened and retrieved all possible titles and abstracts and potentially relevant studies to established whether the study met the inclusion criteria. The results of the review revealed that ICTs have certain influences on online CPD for educators and that this influence applies to educators.

Keywords: continuous professional development, research trends, online educator, ICT, research trends

1. Introduction
Teaching nowadays requires every educator to equip themselves with up to date teaching strategies, teaching competencies, incorporate contemporary teaching strategies, and become apprised of advancements in subject knowledge [1,2]. These have become a challenge to many of them as they have to cope with their students’ need and demand and to meet the 21st-century skills in education. It is necessary to design extensive CPD programs, which include the use of successful strategies to reach the ultimate goal of CPD. We, therefore, contended that this study is important in understanding the bigger picture of continuous professional development for online educators. Scholars have agreed that effective forms of CPD suggest active, reflective, sustainable, and job-embedded professional development programs [3-5].

CPDs are aimed at the professional knowledge and skills required for specific professions. It requires self-management by employees and the opportunity development management by the organisation. It is relevant for all layers of employees in the organisation to provide learning management and training that can contribute to the maximum work performance [6]. CPD is also part
of the lifelong learning process (lifelong learning) for both professional and corporate professionals[7,8]. CPD can be an educational activity that helps in maintaining, developing, or improving knowledge, troubleshooting and technical expertise in achieving better and more effective service performance[9,10]. It was agreed that CPD was able to become a systematic method to maintain the improvement and expansion of knowledge and skills of the individual who are required by the professional members in their daily duties. CPD can form formal activities such as seminars, workshops, and specific courses[10].

In order to design an accurate system and module, Ministry of Education (MOE) has outlined 11 shifts of transformation with the fourth one was to upgrade the quality of continuous professional development (CPD) from 2013. In conjunction with that, they introduced Continuous Professional Development (PPB) framework that was adapted from the Model of Educator Talent Management Framework[11] as in figure 1.1.

![Figure 1: Professional Development Framework adapted from Model of Educator Talent Management Framework](image)

In the blueprint, they aimed for enhancement of Education Officers’ (PPP) Professionalism and also to strengthening teacher training institute (IPG) and Institut Aminuddin Baki (IAB). Several strategies to implement CPD has been identified for it has to take into consideration on budget-wise. Therefore, MOE has suggested a CPD approach as in figure 1.2 below. By using this approach; MOE, organisation and individual will initiate appropriate activities to ensure it matches the blueprint guidelines.

1.1 The CPD implementation
MOE committed in its vision to provide a competent educator who earned standard established quality. This standard will be a basic guideline to the educators, training institutes and other CPD training provider or agencies.

2. Literature Review

Continuing professional development is needed because initial educator education cannot contain all of the propositional knowledge that is needed and certainly not that procedural, “how-to” knowledge which grows in practice. The consequences of this may be dire, particularly for every educator—and especially every distance educator and trainer—should consider the potential of online media as an element of their practice[12].

Many authors, for example, describe how they felt about the characteristics of the training programs, which can help teachers to apply teaching methods and strategies in the classrooms successfully. These characteristics are critically for effective professional development practices that focus on improving teachers’ knowledge and skills [1][13].

- Extensive opportunities for both formal and informal in-service development;
- Time for professional learning and collaboration built into teachers’ work hours;
- Professional development activities that are embedded in teachers’ contexts and that are ongoing over a period of time;
- School governance structures that support the involvement of teachers in decisions regarding curriculum and instructional practice;
- Induction programs for new teachers with release time for new teachers and mentor teachers, and formal training for mentors.

We discovered that effective teaching makes a difference in teaching skills and student learning. We also found that, they also defined the characteristics of professional development that make the most difference for teachers:

1. Are concrete and classroom-based
2. Brings expertise from outside the school
3. Involves teachers in the choice of the areas to develop and the activities to undertake
4. Enables teachers to work collaboratively with peers
5. Provides opportunities for mentoring and coaching
6. Is sustained over time
7. Is supported by effective school leadership
Some institutions offer courses in the form of informal learning environments, mentoring, in-service training or structured certificate programs [14] courses that cover various aspects of the teaching process or specific skills or content development modules. However, in practice, the set up behaves differently. These training sessions and workshops conducted usually been too short and too rare to foster a change in teachers’ classroom practices [15]. Recently, the rapid growth of the internet and big data has seen the impact of changes in teaching and learning pedagogy. The wave has sparked an interest in the community due to the implementation of blended learning in education [16,17].

CPD has shown that teaching and learning evolved drastically. It demanded new knowledge and competencies for the teachers to fulfil the requirements in the schools and also the tertiary level. An online structured training program or CPD can help teachers identify the competencies they want to acquire more precisely. The benefits of online training are flexible and can be done anywhere [18]. It is important to provide competent educators so that teaching and learning can be meaningful and effective [19]. The flexible and resource-rich nature of online learning may encourage teachers to use it as a platform for continuing education.

3. Study design
This study aims to identify a pattern from previous studies and improve for future studies. For this study, the following key data were extracted from the published studies to examine the trends with respect to the focus, types, and context of PD, the goals and tools of research and the type of data collected. First, we identified the trends in this analysis of these journal publications, specifically by comparing journal between January 2015 and 2019. We conducted an analysis to identify the variables specified in the focus question of this study. By answering this question, we aimed to uncover the trends that might help us in the following ways; first, the answers may help us in proposing solid, effective and sustainable CPD programs for teachers. Second, the answers may help us in proposing a systematic research map for the next graduate students who are willing to perform research in the field of teacher’s professional development.

3.1. Selection strategy
We searched from these Web of Science and Scopus databases from January 2015 through 2019 to find the targeted journals. Those selected are English written and open access only. We used the advanced search with the BOOLEAN technic search string. We identify and collate the following terms: “continuous professional development (CPD)”, “online training”, and “professional training”. The research resulted in 48 articles related to the terms mentioned.

3.2. Data analysis
The systematic review was steered in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; see Figure 3). Electronic databases were used to conduct literature searches with a variety of keywords to identify articles (see Figure 3). Further articles were identified through scanning the reference lists of publications recovered through the databases to ensure relevant studies were not missed. We limited the search to articles published between January 2015 and January 2019. Each study was assessed against a set of inclusion and exclusion criteria. Excluded studies were tabulated against reasons for exclusion (see Figure 3). A full-text review was conducted for eligible studies, with the finalized set of published studies subjected to qualitative synthesis.

The review methodology involved four steps — identification, screening, eligibility and inclusion. As part of the identification step, a series of electronic databases were used to conduct literature searches, and a variety of keywords were used separately and in combination to identify articles. It is worth clarifying that during the analysis of the research papers, we derived some of the needed information from the abstract and other information from the text. However, for most of the analysed papers, we read the article to obtain all of the information or data we needed.
4. Results
Forty-eight published studies were identified as part of the systematic search. After reading the abstracts, 12 articles were omitted because they were irrelevant to the research questions. After a detailed reading, 26 articles remained. The features and characteristics (focus, types, and context of PD, the goals and tools of research) of each study are presented across the articles. Quantitative tool
analysis dominated the studies with the main purpose is to offer development of knowledge, skills and values and practices.

Four main things discussed were; firstly, the need for long term educational training. Method and practice of teaching have evolved consistently with the changes in the revolution of the industry. The need, demands and supply also changed. From the studies, we discovered that educators transformed their teaching approach and shifted to a new learning environment. From face to face to virtual learning. From chalk and talk to mobile, e-learning and learning platforms[20,21]. Many scholars in the fields consensuses that this new virtual learning environment would improve knowledge, confidence and skills[22-24]. Overall it is clear that an ergonomic training course will support staff competencies development.

Next, one particularly notable point of interest of this study is the perception of the educators. In this context of the study, many of the articles discussed on the perception but not the previous status quo. Nevertheless, with the availability of open resources and transfer of knowledge, they believe that online CPD would serve as a significant tool as the introduction of a modern pedagogical concept. Third, besides the module and coursework, others use online interactive training system and digital story-telling technique as their CPD. Both were aiming at focusing on an individual sense of agency and collegial collaboration and develop their teaching practice. Lastly, this work provided proof that ICTs has the impact of CPD on teaching and learning. This point, in principle, can give rise to the investigation of other perspectives of CPD for educators.

5. Discussion and Conclusion

This paper has focused on 26 published studies on continuous professional development courses for online educators. Along with the expanding growth of the industrial revolution, we noticed that teaching and learning had developed too. This study aims to extract the value and appropriateness of the trends in the field. However, this study was limited to the collection and analysis of data contained in the year mentioned only. Therefore, we aimed to expand on the results of a previous study in which more studies should focus on the framework design and the improvement of the CPD for online educators.

Besides, analysing research studies related that published in well-respected journals would also improve the quality of future CPD programs in Malaysia, it would also help in determining research priorities related to professional development in Malaysia. It might contribute to the reform attempts targeted educator preparation programs in Malaysia. Therefore, our study contributes to these fields.

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