ORIGINAL ARTICLE

The effect of professional teaching videos induction and online focused group discussion on the development of teacher competences

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Abstract

This study investigated the effect of video-based teaching practice followed by focused group discussion via electronic collaborative discussion forum (ECDF) on the development of teacher competences. The trend of change on teacher competences of 30 Iranian English as foreign language teachers was traced before and after treatment on quantitative and qualitative measures. First, a newly designed and validated teacher assessment questionnaire named Teacher Balanced Score Card (TBSC) was used to quantitatively account for the developments of teacher competences including clinical, critical, technical and personal from teacher, student and administrative perspectives. In quantitative measure, supervisors' real classroom non-participant observations and theme elicitation through log analysis of ECDF according to a predetermined data coding schemata helped documenting evidences for teacher competence development on TBSC measure in pretest/posttest design. Multivariate analysis of variance results indicated that there were significant changes in technical and clinical competences. The theme elicitation in log analysis of ECDF implies that the required infrastructure for incorporation of technology, culture cultivation of its use, its role in establishing non-threatening supportive platform for teacher evaluation and its potential in teacher reflection, change initiation and management should be revisited at high levels of policy making and local levels.

Keywords Collaborative reflection · Teacher competences · Video-based teaching practice · E-collaboration

Abbreviations
VBTP	Video-based teaching practice
ECDF	Electronic collaborative discussion forum
EFL	English as foreign language
TBSC	Teacher Balanced Score Card

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MANOVA   Multivariate analysis of variance
ICT   Information and computer technology

1 Introduction

Technology has become a key ingredient of educational systems. Literature is fueled heavily by how information and communication technologies (ICT)' revolutionary effect on how learners are affected has a well-documented history (Stošić & Stošić, 2015). Literature thoroughly acknowledges ICT to have a decisive and predictive effect on affective factors such as student engagement (Bagheri & Zenouzagh, 2021; Wang et al., 2022) and cognitive factors such as noticing (Alabdulakareem & Jamjoom, 2020) and self-regulation (Li et al., 2022) and learner gain score achievement (Sorat & Mohamadi Zenouzagh, 2022; Zenouzagh, 2020).

However, how ICT evolved teacher development is not equally touched. Due to the connecting potential computers have in connecting members of discourse community through which teachers can develop their psychological and pedagogical competences (Duţă et al., 2014) through supportive learning communities, many teacher educational programs now turn to virtualization. Willegems et al. (2017)'s meta-analysis of 14 articles on how teachers develop through collaborative teacher research proves how preservice teachers develop as they participated in opportunities for online reflection and regulation according to the norms of good practice set as a result of collaborative research in discourse community. Cross-cultural discussion and collaboration indicated how critical inquiry and reflective discourse can help preservice teachers reconsider assumptions they have established about teaching and learning (Moran et al., 2017).

Several studies have investigated how information and computer technology (ICT) can assist teachers preservice programs (Mohamadi & Malekshahi, 2018; Tondeur et al., 2018; Zenouzagh, 2019). Multimedia education such as professional video-based teaching is reported to have significant potential in assisting teachers acquire, develop, integrate and implement good teaching practices (Han et al., 2013). There is emerging but limited literature on how video affects teacher improvement (Gaudin & Chaliès, 2015; Zottmann et al., 2013), increases teacher confidence and motivation (Beach, 2017) and instructs teacher learners how to put theories into practice through situated teaching (Hatch et al., 2016).

Despite emerging literature on video-based teacher learning, the overview of it is far from being complete. First, most of the studies on video-based teaching utilized videos as a source of online information exchange and teacher modeling (video case study) with less attention on using them as platforms for analysis and discussion and therefore neglect their potential in teacher development through instigating reflective discussion within discourse community (Christ et al., 2017) and, respectively, miss the potential of computers in connecting individuals and collaborative growth. The collaboration online has the potential to make "community of inquiry' which facilitates learning with and through others (Turula, 2017). Social media open up new venues for professional and help one develop his cognitive inquiry, work and solve the problems while accompanying others and sharpen one's understanding of the teaching he does with the help of others (Turula, 2017).

Second, most of the studies on the effect of video-based teacher induction are product-oriented in nature as they trace teacher development through pretest to posttest changes in cloze item tests such as knowledge tests or questionnaires (Gold & Holodynski, 2017). Therefore, more process-oriented studies which investigate the potential support and

barriers to video use are needed to cover the adequacy and effective integration of technology into teacher education in general (Niess & Gillow-Wiles, 2017) and video-based teaching in teacher education in particular. Third, studies indicated that the video case studies, video-embedded in multimedia contexts (So & Brush, 2008) and video self-reflection (So, 2012) may lead to teacher learning (Arya et al., 2015; Baecher et al., 2012). However, little evidence was documented on the effect of video-based practice and discussion and its effective power on teacher development (Christ et al., 2014). This study aimed at investigating how exposure to video teaching practices followed by online focused group discussions on digital platforms such as forums affects teachers' teaching competences.

2 Literature review

2.1 Preservice teacher's professional vision development

Teacher vision refers to teachers' reflective ability to notice features of classroom events that are relevant for student learning and to analyze and interpret those events using prior content knowledge and prior pedagogical content knowledge, namely domain-related pedagogical principles and concepts (Michalsky, 2021). Professional vision in teacher education is conceptualized as a complex dynamic interplay of teachers' higher order thinking skills before and after decision making and action planning "dynamic interplay of top-down and bottom-up processes" (Schäfer & Seidel, 2015) and thereby helping teachers provide effective learning opportunities. van Es and Sherin (2010) appealed to teacher educators to help preservice teachers go beyond analyzing and interpreting teachers' classroom behaviors by using scaffolding techniques with teacher trainees that emphasize students as the main actors in classroom interactions. Video observation and reflective analysis of classroom situations has been shown to promote teachers' application of PV abilities, such as noticing and reasoning about students' learning and thinking behaviors, as well as predicting alternative instructional strategies.

2.2 Video-based teaching practice

Video methods utilize tenets of high-quality teacher education and support education students' learning and application of learning to teaching practices. However, how frequently video is used in teacher education and in what ways is an open area of enquiry (Arya et al., 2016).

How multimedia assisted preservice teachers to integrate their teaching to technology by Han et al. (2013) revealed that integrative knowledge is constructed through video-based cases which show real classroom practices helped teachers have higher scores on pedagogical and technological knowledge on pre- and post-survey measurements. In addition, research investigated how content acquisition podcast which are videos including behavioral models in teaching vocabulary helped teachers have higher scores on teacher knowledge of vocabulary teaching behavior test and classroom observation (Ely et al., 2014). Besides, Hatch et al. (2016) study of how teacher's reflection and discussion of video-based evidences helps teacher's learning to connect theory and practice indicated how complex and difficult it is to assist teachers transformed their practices and strategies in reflective way suggesting that analyzing video cases is not sufficient to enhance preservice teachers' skills; rather, the analysis needs to be accompanied by

specific instruction and guidance. Kennedy et al. (2013)'s study also supported that multimedia evidence-based practice increased teacher candidates' knowledge of phonological awareness and in turn students' achievement. Liu (2012) also indicated that preservice and in-service teachers' focus of attention is shifted to the similar aspects as a result of being engaged in online discussion messages after video watching which shows how video-based evidence practice in teaching can help teachers converge.

Besides research showing efficacy of video-based teaching, several studies have been conducted on the mediating role of variables on the effect of video-based teacher modeling on teacher change. Christ et al. (2017) study of more frequent and varied uses of video-based evidences in teacher education classes indicated that the effect of video-based teaching for perspective teachers is mediated by various other variables such as institutional supports, course attributes, types of video uses and many other factors. The evidence-based practice accompanied by multimedia such as content acquisition podcast with video modeling also supported an increase in teacher positive intervention (appropriate prompts and questions, behavior specific praise and precorrections) and more student engagement [number of on task students to the total number of students (Kennedy et al., 2017)].

In addition, Gaudin and Chaliès (2015)'s meta-analysis of 250 articles on the use of video-based teacher education revealed that although there is research based consensus on the efficacy of video-based teacher induction on teacher motivation, teacher cognition and classroom practice, there are various factors that mediate its effect including the objective of video use, the nature of video (whether it is self, peer, professional practice videos), follow up activities. Accordingly, Comi et al. (2017)'s study of the role of information and computer technology in student achievements indicated that the efficacy of teachers' use of technology depends on the way it is inducted and implemented by them and actual teaching practices they have out of technology use. Røkenes and Krumsvik (2016)'s study of how information and communication technology mediated teaching practices and their efficacy through surveys, semi-structured interview and observations indicated that various factors affect teachers' digital competence and its implementation to the benefits of students including degree of support available, amount of collaboration, modeling and scaffolding available. Yeh et al. (2017)'s video-embedded and discipline based questionnaire analysis indicated how technology affected teachers' technological pedagogical content knowledge and the path analysis indicated that there is a hierarchical interrelation between the cognitive abilities; evaluation, evaluation/synthesis, application/analysis and knowledge and comprehension, with knowledge and comprehension at higher levels and application and analysis at lower levels. Therefore, they suggest that knowledge and comprehension ability plays significant role in determining the teacher development as it influences the quality of content, technology and its integration. Pryor and Bitter (2008)'s study through interview with teachers suggested that multimedia in the form of video modeling affects teacher development if opportunities for reflection and recursive use are provided. Zottmann et al. (2013) affirmed that digital video cases in teacher education can help teachers' application, acquisition and convergence of the knowledge. The mediating role of teaching experiences indicated that preservice teachers were more affected by video evidence-based learning than in-service teachers measured by knowledge gap test before and after the treatment. Although the educational potential of video analysis has largely been recognized, the simple provision of opportunities to analyze video cases is not sufficient to enhance preservice teachers' skills; rather, the analysis needs to be accompanied by shared understanding constructed via specific instruction and guidance which is examined in the current study.

2.3 Teacher competences

At the level of teacher professionalization, generic models of professional competence are currently used by empirical educational research, comprising both cognitive and affective-motivational areas (Baumert & Kunter, 2013) Multidimensional approaches to the description of dispositions relevant to professions can already be found in the well-known work of Shulman (1987). His differentiation into various facets of the teacher knowledge base has shaped the scientific discourse until today (Guerriero, 2014). According to (Kaiser & König, 2019), in the last few years, substantial progress has been made toward the understanding that teacher competences are personal traits (i.e., individual dispositions relatively stable across different classroom situations) but that they also include situational facets (Kaiser et al., 2017).

Competence has been defined as professional skills required for well performance and auspicious accomplishment (Blašková et al., 2014a, 2014b). Competence in the field of teacher education equates ones' ability in critical revisiting of teaching act and education policies which in turn equip teachers with the required expertise to design their teaching to reach the related objectives. In recent years, Blašková et al., (2014a, 2014b) has strongly influenced the concept of competence in large-scale teacher education studies. It comprises cognitive abilities; the motivation, volition, social willingness and ability to solve problems; and the motivation, volition and social readiness to implement solutions. In particular, Blašková, Blaško, & Kucharčíková's definition has been taken up and specified, among others by Zenouzagh (2019) and Mohamadi and Malekshahi (2018) emphasizing the understanding of competences as context-specific, cognitive performance dispositions that are functionally responsive to situations and demands in certain domains. This understanding contains essential aspects of psychological competence concepts. Teacher competence entails cognitive dimension which is related to teacher knowledge. It also encompasses functional dimension which equates with teacher skills. Attitudes and value dimension which contains teacher autonomy and responsibility is another dimension (Mohamadi & Malekshahi, 2018). Integrating these different dimensions, Blašková, Blaško, & Kucharčíková presented a framework of teacher competences that takes this interaction of personal, situational and social characteristics into account.

According to Blašková et al., (2014a, 2014b), teacher competence encompasses seven categories; branch-specific; didactic and psycho-didactic; general educational; diagnostic and interventional; social, psycho-social and communicational; managerial and normative; professionally and personally cultivating. Further, Blašková et al., (2014a, 2014b)'s study of student surveys on positive and negative teacher behaviors proposed personal, educational, communicational, professional, science and research and publication competences as significant teacher competences. Blašková et al., (2014a, 2014b) found the key personality competences through a survey of a very comprehensive sample of teachers and students. The personality competences include creativity competence (productive thinking, original ideas, inventions and discoveries to further knowledge), motivation competence (the teachers' willingness for learning and growth) and reflection competence (the teachers' continuous introspection). Gil-Flores et al. (2017) also investigated the factors mediating the efficacy of ICT and they found that teacher characteristics that help implement ICT in classes can cover up the lack of infrastructure supports in Spain. The teacher characteristics were the competences like collaboration with others, self-efficacy of teachers and teachers' attitudes toward ICT.

García-Martín and García-Sánchez (2017) suggest that in line with the progress of technology, another dimension of competence is suggested that digital literacy or competence includes instrumental, cognitive-intellectual, sociocultural, axiological and emotional skills. Accordingly, Almerich et al. (2016) propose technological competence and suggest that it mediates teachers' pedagogical competence and also is mediated by age, gender, frequent use and classroom computers. Røkenes and Krumsvik (2016) suggest modeling, scaffolding learning experiences, collaborative learning and access to support and resources as keys to the development of digital competence. Zimpher and Howey (1987) describe four teacher competences. Clinical competence is the ability to do collaborative action research and improve the teaching in the light of assessment and evaluations made through it. This competence helps teachers to identify problems in teaching and find solutions. Personal competence urges teachers to establish interpersonal competence which is interacting with other and in turn undergoing human development. This requires teachers to develop a sense of community with member of discourse community. The support and critical feedback teachers receive from other members of community help them establish self-awareness and get developmentally mature. Technical competence is the ability to make theory driven microteaching practices such as questioning strategies and make principled decisions about how to put theory into practice and improve their teaching. Critical competence is macro teaching practices that are influenced by putting the act of teaching in broader context of society and schooling. This requires teachers be aware that their teaching is affected by the ideology's schools have and be responsive to the changes in ideology of schools through critical action research.

2.4 ICT, collaborative teacher forum discussion and teacher competence development

Increasing the use of technology across education systems offers potential benefits for mediating teacher competences. Educational technology can facilitate the effective delivery of teacher preservice development, especially in remote areas and for teacher peer support, one-to-one coaching and reflection—through exploiting affordances such as two-way communication, audiovisual media capability and ease of access (Hennessy et al., 2022). Technology integration brings additional needs to upskill teachers. For example, learning gains from personalized, adaptive technology use are greater when an experienced teacher is available to offer contextualized input and feedback. Professional learning mediated through technology use can potentially contribute to improving teaching quality.

Internet and Communication Technologies (ICT) present tremendous potential for collaborative model's teacher development where both the preservice or in-service teachers and the mentors can benefit from interactions. Online collaborative teacher discussion forum is thus anchored in the notion that mentoring processes that are successfully aligned with the dynamics of (online) learning communities and characterized by supportive interpersonal relationships, collegiality, constructive feedback and authentic learning can enhance teachers' professional growth (Mullen & Schunk, 2010). According to Dorner and Kumar (2016), collaborative approach where novices and experts work together and a combination of technical, instructional and emotional support is provided has been found to be effective for mentee learning. Collaborative discussion forum integrates the formal mentoring primarily orchestrated by teacher educators as well as the community-driven processes of peer mentoring through online co-construction of teaching materials embedded

in authentic, problem-based pedagogical situations, that is, classroom experiences where technology integration should occur. Preservice teachers, teacher educators and mentor teachers are all members of a democratic community and leadership roles are interchangeable, depending on the purposes of the actual problem-solving situation. Therefore, investigating its potential in foster teacher competences can help enrich and empower teachers' proximal development.

2.5 The present study

Although aforementioned studies on teacher professional video inductions are both timely and important, they are far from being complete for a number of reasons. Almost all the reported studies use one shot achievement knowledge test to track the effect of video-based teaching practice and therefore, fail to document the changes from a more process-oriented approach (Bower et al., 2011). In this study, such a void is intended to be filled using semester long discussion after video-based teaching practice in an online forum to document the process of change for pretest to posttest. Second, the aforementioned studies focused on either psychological trait of teachers such as motivation or classroom practice and therefore investigating the potential of video-based teaching practice on teacher competence is potentially interesting area for enquiry.

This study is anchored with sociocultural theories of learning and undergirded by empirical studies pertaining to this theory. Three tenants including social interaction, modeling and scaffolding within the zone of proximal development and artifacts are important. Social interactional leads to learning and internalization of it, modeling and scaffolding maximizes optimal learning through adoptive support for completing a task and artifacts such as videos and technology mediate the process of learning. Given the importance attributed to social interactions and collaborative reflection which scaffolds learning by helping the learners' notice their current level of development and their optimal level of development along with new learning artifacts such as technology, this study is intended to investigate the potential benefits of video-based teaching along with collaborative discussion on teacher competences.

This study is novel in its use of instruments in documenting teacher development. A discussion forum was designed to help teachers' collaborative reflection on video-based teaching practice. Instead of considering videos as case studies by which teachers are provided with teacher modeling, in this study, video-based teaching is accompanied with teacher online collaborative reflection and discussion through the forum. Second, the effect of videos and collaborative discussion on teacher competence was measured not through knowledge and awareness tests. Rather, teacher change was measured on TBSC through process-oriented approach in that theme elicitation and log analysis of collaborative discussion forum followed by real classroom observation were utilized to document competence development in semester long duration. TBSC was designed on the basis of theory driven indicators of teacher competences and attested in terms of the required psychometric properties by the author and co couthers in several related studies (2018, 2017). Recently, balance score card which is originally used to manage customer services in successful business by which adequacy of organization for optimum product sells was adapted for implementation in teacher education programs (Hughes & Pate, 2012). Classical balance score cards investigated successful performance form financial, customer perspective, internal business process perspective and learning and growth perspective. Teaching balance score card delves into successful teaching from

institutional, student perspective, departmental/administrative perspective and learning and growth perspectives. Teacher balanced score card is promising as it connects teachers, students and education administrators to have fuller account of each other's' expectation and address the issues at which student rating of students can be considered as valid and reliable (Zenouzagh, 2019).

Having considered the lines of arguments mentioned in the previous section, the researcher intended to investigate the effect of video-based induction for student teachers followed by online group discussions via a forum on the development of teacher competences including clinical, critical, personal and technical competences evaluated from three perspectives of student, teacher and administrative perspectives which was measured before and after the induction through a previously designed and validated questionnaire named TBSC. The trend of change in teacher competence was traced before and after induction. To this purpose, the following research question was set to find the answer:

(1)   What is the effect of video-based teaching practice affect teacher competences measured on teacher balanced scorecard? And how teachers self-evaluate its efficacy?

3 Method

3.1 Participants

3.1.1 Teachers

Thirty Iranian male ($n=8$) and female ($n=22$) EFL teachers with more or less the same years of teaching experience ($\bar{x}=5$) and ranged 26–32 in age ($\bar{x}=29$) participated in this study. All teachers were MA graduates in EFL teaching advance writing classes in language center of researchers' institution and its franchises. The teachers were from traditional teaching convention of receiving the potential good teaching practices form the stakeholders and conveying them to the class. Having preset teaching practices leaves little space for teaching innovations. There were 6 groups of 5 teachers on the forum.

3.1.2 Supervisors

Three supervisors (male $=1$ and female $=2$). They were assistant professors of teaching English as Foreign language with 7–10 years of supervisory experiences. To maximize their motivation and their serious effort in the study, they were paid accordingly. They were briefed about the objectives of the study. They played role in this study at two phases. First, they coded the indicators of teacher improvements on teacher competences. In so doing, they were instructed about theme elicitation through log analysis of discussion forum according to indictor elicitation schemata introduced later in the section. Second, they acted as observers to track the teacher competence development indicators. They were also non-participant observers of real classroom observations. The purpose of drop in observations was cross validating the elicited indicators of change in teacher competence in log analysis.

3.1.3 Panel of expert

The panel of experts included 5 Assistant professors OF TEFL (Male: $N = 3$ & Female: $N = 2$). They contributed in in designing and organization of the competence indicators of TBSC according to related literature review and guidelines of Competency Framework for Teachers proposed by department of education and training in Australia (2004). The results of 30 h of focused group discussion lead to transparency and relatedness and appropriateness of the perspective indicators of four different types of teacher competences indicated. The resulting questionnaire was subject to reliability and construct analysis discussed in later section.

3.2 Instruments

3.2.1 Teacher balance score card

TBSC incorporates multiple measures of teacher performances. TBSC is a 65 item questionnaire which includes information about the indicators of clinical (16 items), technical (25 items), personal (15 items) and critical (9 items) teacher competences from three perspectives of student, departmental/administrative, learning and growth rated on five likert scales of unacceptable, slightly unacceptable, neutral, slightly acceptable and acceptable points (Online Appendix) (Mohamadi & Malekshahi, 2018). Table 1 indicates the structure of TBSC and sample items on different teacher competences from student, departmental and learning perspectives. Cronbach's alpha reliability indices for the three main perspectives of student, departmental and learning perspectives and their dimensions were .90, .91 and .76. The latter had only ten items. The reliability indices of the dimensions ranged from a low of .65 for personal aspect of learning which had only two items to a high of .93 for the technical aspect of departmental perspective (Mohamadi & Malekshahi, 2018; Zenouzagh, 2019).

3.2.2 E-collaborative discussion forum (ECDF)

Teachers were asked to have an account on the website www.e-writingforum.ir. Some of the features of this website are as follows: (1) sharing with anyone meaning the teaching videos or any other supplementary files; (2) online comments which are provided through collaboration on specific pieces of teaching; (3) discussion tools by which participants could share ideas, review changes and gather feedback in one place.

They were instructed and briefed on how to use the forum for sharing the teaching insights they receive through teaching videos, sharing and collaboratively constructing knowledge, reflecting collaboratively, identifying teaching problems they have and suggesting solutions. Supervisors had non-participatory analysis of discussion logs to elicit the themes or indictors of teacher competence change. Supervisors were supposed to complete TBSC on four occasions: two at the beginning of induction as the pretest and two at the end as posttest.

3.2.3 Video-based teaching practice

Series of professional teaching videos teaching how to teach writing were selected from YouTube.com focusing on classroom management skills. Zottmann et al. (2013)'s

Table 1 Structure of teachers balanced score card

Perspectives	Student		Departmental		Learning	
	Items	Example	Items	Examples	Items	Examples
Technical	7	Allowing the students to organize and distribute part of the assignments to be performed in the course	16	Providing the contents following a clear and logical framework, highlighting the important aspects	2	Using of technology when conducting lectures
Clinical	10	Catering for individual student learning styles and needs	4	Providing the contents following a clear and logical framework, highlighting the important aspects	2	Examining what one is doing in the classroom and making needed changes
Personal	10	Facilitating student–student and student–professor interaction	3	Working cooperatively with colleagues	2	Engaging in informal dialogue with your colleagues on how to improve your teaching
Critical	1	Explaining own developing approach to teaching and learning	4	Developing and applying and understanding to the curriculum policy and program teamwork	4	Initiating action to promote ongoing professional growth

framework for selection criteria of educational videos was used which included (a) relatedness to the topics of education, (b) complexity level of videos which are in gear with novice and experienced teachers professional experience and whose flow of information is easy to follow, (c) ambiguity which is related to the amount of possible distractors affecting visual and audible quality and clarity. The content of videos was mostly about how to write an essay, introducing the components of an essay, the common mistake the novice writers make and rules novice writers need to observe with respect to classroom management skills Tenets of high-quality professional development (PD) that were culled from the research literature (Arya et al., 2016) were utilized in the video methods. Video case studies are including teachers viewing an exemplar video of a pedagogical practice and discussing it with their teacher educator and peers. Video case studies allow education students to discuss teaching practices using multiple perspectives and grapple with decision making in complex and ill-defined domains and reflect on what went well, not so well and potential changes for future teaching. Teacher presents a video segment from of her instruction and identifies the topic or question to be discussed, (2) her colleagues view this clip, and (3) the teacher and her colleagues discuss the topic or issue identified by the teacher. These video discussions with peers provide opportunities to develop critical reflective discussion skills and multiple perspectives about the event. This results in reconsidering, shifting and deepening their previous beliefs and knowledge about pedagogy, as well as developing understandings about the complexities of teaching events.

3.2.4 Drop in observations

Supervisors' non-participant observations of teachers' teaching and teachers' discussion on the forum were the key to trace the trend of change in teacher competences and their documentation of TBSC evaluation inventory before and after the treatment. The supervisors had four drop in non-participant observations of the teachers' classes and teachers' discussion on forum; two at the beginning of the teacher induction program and two at the end of the program. The supervisors were asked to rate the teacher' competences on the basis of performance indicators they observe in the class and forum on TBSC measurement scale according to the following indictor elicitation technique.

3.3 Data collection and procedure

After participant selection, instrument design and evaluation and selection, the researcher briefed teachers and supervisors separately on different occasions. The briefing sessions for the teachers included the shared lesson plan on teaching writing, professional video –based teaching practice provided for them in compact disks and working with the online discussion forum. The supervisors were also briefed about how they were supposed to judge and evaluate teachers on TBSC through log analysis of collaborative discussion on forum. Two observations at actual classroom site and the log analysis on ECDF helped the supervisors to assign scores on TBSC in pretest and posttest stages of the study.

The log analysis included the supervisors' study of printed log of the teachers' collaborative discussion on ECDF to elicit attended themes. The data on log were coded using initial coding of the data by reading the log prints and highlighting relevant themes and assigning informative labels to them and then second level coding was used to identify and classify similar or closely related themes. Discussions of teachers were assessed using Bakker et al., (2011)'s schemata which required supervisors look

for negative and positive evidences of teacher competence, look for (counter) evidences of what contributes to professional thinking and acting, differentiate less and more important evidences and assign score, specify if entire performance can be attributed to specific level of competence and write a brief summary in which comments on scores were given and important arguments and evidences are cited, consult follow assessor and discuss if the assigned scores can be compared, discuss the assigned scores and the rational by providing evidences and arguments and determine whether to hold on to the original score or make adjustments. It should be mentioned that personal views of assessors cannot be completely eliminated. To minimize this effect, several sessions of briefing was conducted for the supervisors who rated teachers. Besides, the inter-rater reliability Cronbach alpha level of .68 indicated high reliability in decisions made about portfolio by panel of experts. The log analysis helped the supervisors to fill the TBSC for each teacher to track changes on teacher competences. The study took one semester of 4 months covering 18 sessions, one session each weak.

4 Data analysis

A MANOVA was run to compare the participants' means on the four teacher competences of technical, clinical, personal and critical in order to prove that they were homogenous in terms of their means on these four competences at the one set of the study. Based on the results, it can be concluded that there were not any significant differences between the participants' means on these four teacher competences (F (3, 27) = .583, p = .631, Partial η^2 = .061 representing a moderate effect size). The subjects had the almost the same means on technical (M = 3.80), clinical (M = 3.73), personal (M = 3.76) and critical (M = 3.93) teacher competences (Fig. 1).
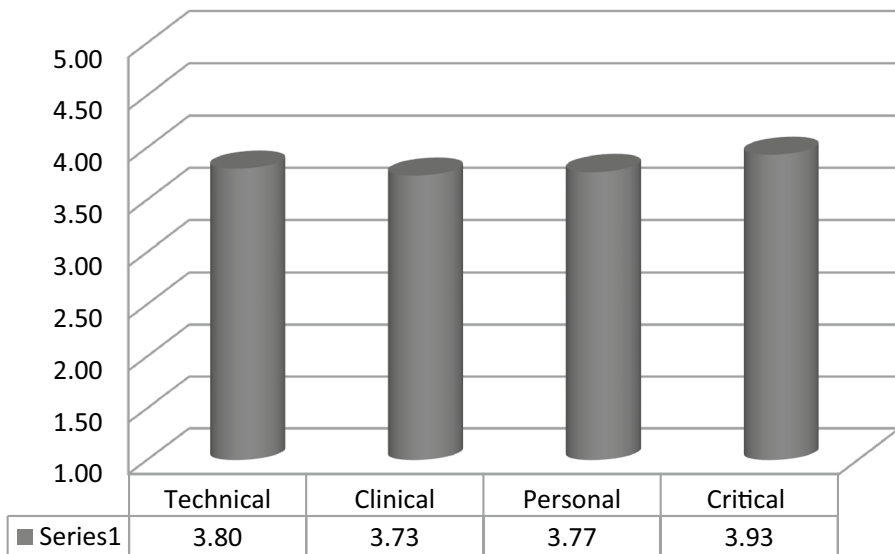

	Technical	Clinical	Personal	Critical
■ Series1	3.80	3.73	3.77	3.93

Fig. 1 Means on pretests of teacher competences

Table 2 Multivariate tests; posttests of teacher competences

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial eta squared
Pillai's trace	.628	15.204	3	27	.000	.628
Wilks' Lambda	.372	15.204	3	27	.000	.628
Hotelling's trace	1.689	15.204	3	27	.000	.628
Roy's largest root	1.689	15.204	3	27	.000	.628

4.1 The effect of video-based teaching practice on teacher competences

A MANOVA was run to compare the participants' means on the posttests of four teacher competences. Based on the results displayed in Table 2, it can be concluded that there were significant differences between the participants' means on the posttests of four teacher competences (F (3, 27) = 15.20, p = .000, Partial η^2 = .628 representing a large effect size).

As displayed in Table 3, the participants had the highest mean on personal competence (M = 6.13). This was followed by clinical (M = 5.80), critical (M = 5.16), technical (M = 5.13) teacher competences (Fig. 2).

Table 3 Descriptive statistics: posttests of teacher competences

	Mean	SE	95% confidence interval	
			Lower bound	Upper bound
Technical	5.133	.178	4.770	5.497
Clinical	5.800	.182	5.428	6.172
Personal	6.133	.133	5.861	6.406
Critical	5.167	.160	4.840	5.493

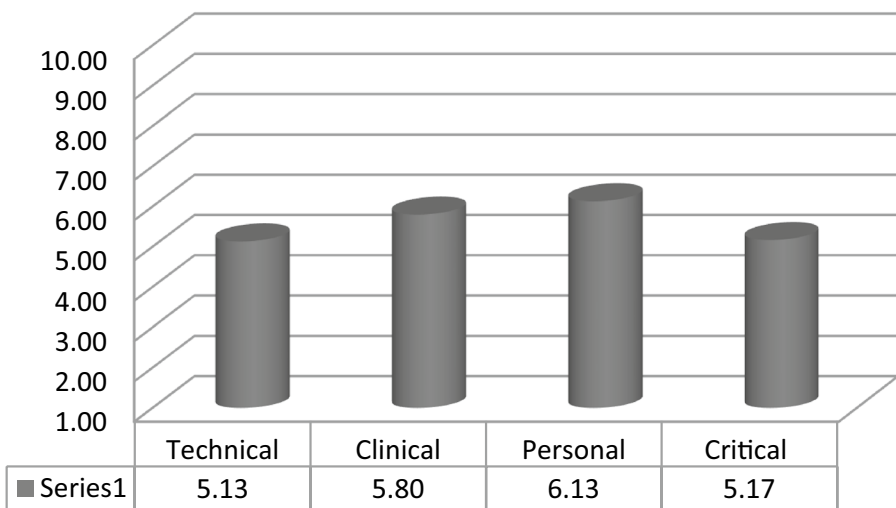|	Technical	Clinical	Personal	Critical
Series1	5.13	5.80	6.13	5.17

Fig. 2 Means on posttests of teacher competences

Table 4 Pairwise comparisons: posttests of teacher competences

(I) Comp	(J) Comp	Mean difference (I–J)	SE	Sig.	95% confidence interval for difference	
					Lower bound	Upper bound
Personal	Technical	1.000*	.159	.000	.675	1.325
	Clinical	.333*	.161	.048	.003	.663
	Critical	.967*	.212	.000	.534	1.400
Clinical	Technical	.667*	.182	.001	.295	1.038
	Critical	.633*	.227	.009	.168	1.098
Critical	Technical	.033	.227	.884	− .432	.498

*The mean difference is significant at the .05 level

The results of the post-hoc comparison tests (Table 4) indicated that;

(a) The personal competence ($M = 6.13$) had a significantly higher mean than the technical one ($M = 5.13$) (MD $= 1$, $p = .000$).
(b) The personal competence ($M = 6.13$) had a significantly higher mean than the clinical one ($M = 5.80$) (MD $= .333$, $p = .048$).
(c) The personal competence ($M = 6.13$) had a significantly higher mean than the critical one ($M = 5.15$) (MD $= .967$, $p = .000$).
(d) The clinical competence ($M = 5.80$) had a significantly higher mean than the technical one ($M = 5.13$) (MD $= .667$, $p = .001$).
(e) The clinical competence ($M = 5.80$) had a significantly higher mean than the critical one ($M = 5.15$) (MD $= .663$, $p = .009$).
(f) There was not any significant difference between critical ($M = 5.15$) and technical ($M = 5.15$) (MD $= .033$, $p = .884$).

4.2 Theme elicitation through log analysis of discussion forum

The logs of electronic discussion forum along with classroom observations were studies by supervisors and coded according the procedure mentioned in the method section as indictors of teacher competence. The following episodes were taken from the collaborative forum to indicate their collaborative construction of teacher competences as a result of video-based induction. The lines of episode show themes such as reflection (lines 2, 6), innovations at local level (lines 3–7), environmental support (line 4) and ideological, psychological and technical change (lines 9–10).

1	A	I have almost every session similar experience we saw in the video about problematic students. I personally set the classroom ethics at the beginning of the class and show how strict I am about these rules
2	B	But I think the teacher in the video acted professionally when you give responsibility to problematic students, they have to change their attitude to accommodate their responsibilities in the class

3	C	Yes, this may mitigate their rude behaviors in the class. But, we can also talk with the students and ask him or her to express himself and herself, may be this problem is rooted in his family background. We can also talk out of school in a friendly visit to each other in cafe shop
4	B	I am afraid not because that may be misinterpreted by the parents and also school principles. Unfortunately, teachers do not have support from parents and stake holders and their well intentions might be misinterpreted
5	A	I do agree, but we can have an education consultor in school and students may talk about things they do not feel confident to teachers,
6	B	That could be great. I also think this can give schooling matters a scientific stand when compared to consultation with teachers in out of school context
7	C	We can also have online friendly chats in online collaboration platforms with school leaders, teachers and parents and the same videos can be displayed and we can ask what they would do in this situation. This can help them to reflect and decide
8	A	With the low infrastructure standards, we will add another problem to the context and not all families have the same technological equipment and that can create more frustration and digital divides
9	C	But we should speak out and the governors can think of more equipment and facilities that can help us to respond to unexpected situations and ask for professional advices, this was the first time we have classroom management skills training. One of my friends in Netherland says they have 360 degrees virtual reality for their teacher developments programs and now with COVID 19 pandemic we understand how we left behind and there is a need for quick actions to take
10	B	I cant agree more but complains in our educational systems means we fight against authorities our educational systems are very totalitarian and democracy and voice are what we teachers should bring forth and for which we pay heavy price …..(the conversation is continued)

Table 5 indicates the themes elicited from log analysis and sample episodes indicating the theme. The indicators centered around four themes that signified how participants identified the efficacy of video-based induction and collaborative discussion forum on teacher competences which include reflection, innovations at local levels, environmental support and ideological, psychological and technical change.

Simultaneously and at every stage, the preservice teachers discuss, share and critique their resources, plans and beliefs about teaching with technology grounded in a pedagogical problem with and peers in an online environment. The inclusion of multiple perspectives and engagement from practicing expert teachers, teacher educators and their peers with the common goals of student learning and teaching enhancement can lead to reflective teaching and the formation of a collegial community around the pedagogical integration of technology.

As it can be seen from the theme elicitation, support from administrators, access to technology and experiences using technologies were significantly linked to consideration of video-based induction contributing to teacher competences. These include support from administrators for implementing video-based self-reflections, access to technology to support video discussions with teacher educators and opportunities to expand teacher educators' experiences with technology.

Teaching communities have long been excluded from decision-making processes pertaining to schooling and the preparation and development of teachers. Sociopolitically, teacher education has epistemologically privileged witness and other dominant ways and systems of knowing, while making invisible endarkened epistemologies. Addressing the sociopolitical component of the teacher education debt requires changing relations with such communities, collaborating with them to foment the transformation of existing conditions rather than seeking to accommodate them.

Table 5 Theme elicited on log analysis of discussion forum

Reflection

Video-based teaching practice is definitely a professional experience since it helps us understand the teaching we do, it helps us understand the quality of our teaching

Video-based teaching helps us to find out the strength and weakness of our teaching through comparing our teaching with the professional one

It helps us better keep our eyes and ears open to see what works and what does not work in our teaching class

Innovations at local level

It is the best practice. Unfortunately in our in-service classes, we are taught something which does not help us professionally change our classes. We are taught about Islamic laws. It is very illogical. We are supposed to teach English therefore we need to be trained about the most appropriate way of teaching different aspects of English language. None of our students ask us how to read holy Quran why should we be trained about verses holy Quran. Professional videos can help us direct our teacher to a better professional teaching

Environmental support

It is ok if we follow the educational trends around the globe such as video-based teaching but unfortunately it is not supported in Iran. Because if we implement technology in our classes for example this video watching and online discussions are affected by lack of support. Different regions have different internet quality and speed if we apply technology in our classes some of the students may not be able to use high-quality internet and they left behind the rest. This may cause digital gap

People at ministry of education needs to be conceived of the benefits of internet and multimedia learning. Actually they may know but they do not have the facility to incorporate technology in the classes. Classes are really crowded and it is impossible to provide facilities for all students

Parents need to support teachers. I remember once I played a movie in the class and next session one of my students' parent come to class and told me it is better not to take the time of class by having students watch movies. I was shocked because the movie I played was an educational one. It is a cultural phenomenon and everybody should help this change

Video-based teaching was a very good experience but there should be professional teachers providing comments and feedbacks. It is for sure that not all what we see in professional videos are applicable in real classrooms. Thus, this experience could better guide us if it comes with a mentor

Ideological, psychological and technical change

This video is very interesting. It motivated me. I made an animation to introduce complements of essay. My animation was about a sandwich. The two breads at top and bottom of the sandwich were the topic sentence and conclusion. The lettuce, the burger and the cheese were the central paragraphs

The videos helped me be more confident in my teaching. This gave me a model of good teaching so I am not frustrated any more on what is good and what is bad

Video-based teaching practice helps me to be more creative in deigning my teaching. I learned how to use different strategies to maximize learning potential of my class by engaging students. I give more feedbacks, I ask questions in such a way that invites all students to think

5 Discussion

Overview of video-based teaching practice is far from being complete since the related studies use video-based teaching video case study to exchange information online or provide teacher modeling with little or no opportunities for teachers to reflect collaborative on it. Besides, the measurement was product-oriented test of knowledge with no or little coverage of that knowledge was achieved which inspired this research to investigate the efficacy of video-based teaching in semester long collaborative online discussion of teachers to document the process by which teacher competences were affected by

video-based teaching. Having tracked the changes in teacher competences measured on TBSC in preteacher induction of professional video-based teaching practice and post-induction of the same practice backed with electronic collaborative discussion forum, the researcher found that the trend of change in teacher competences were in personal, clinical, technical and critical competences in the order mentioned.

The results of the study corroborate a number of studies which attribute positive effect for video analysis on teacher change (Gaudin & Chaliès, 2015; Harlin, 2014; Quinn et al., 2015; Tripp & Rich, 2012; van Es & Sherin, 2010). Shared among all, is the reflection factor which helps learners notice and identify the gap between what they assume as good teaching practice and actual teaching they do in the class and explicit their implicit and practical teaching skill. An important factor might have influenced teacher competences in TBSC and backed in log analysis of ECDF is teacher reflection.

Reflection entails that teachers go through ongoing enquiry about the actions they take in the class, observe and evaluate them until they research high-quality teaching standards. As with the possible effect of reflection on teacher competences, the results of the study seems to be consistent with several other studies investigating the effect of reflection on teacher change (Çimer et al., 2013; Dervent, 2015; Noormohammadi, 2014; Osmanoglu et al., 2013; Zeichner & Liu, 2010).Teachers acknowledge that video-based teaching practice initiated reflection on several aspects and changes on several grounds. The types of reflection that had accord with the study of digital videos for teacher education by Calandra and Rich (2014). Teachers went through three types of reflection. Descriptive reflection which is reflecting on what is happening in classroom, comparative reflection which is comparing the teaching model they watch and teaching practice they have and critical reflection which is a careful deliberation of the act of teaching and putting it at larger teaching context and develop new perspective in teaching.

Considering the major theme in the log analysis which is a criticism toward teaching policy makers and educational authorities, teachers consider the e-collaborative discussion forum as the most needed among Iranian teachers. Since objectives are set at national and higher scale with giving no voice for teachers, this opportunity is what all teachers in Iranian educational systems need. The most critically viewed theme in ECDF noticed in log analysis was what Iranian teachers receive as instruction in their annual teacher education programs. Strong religious orientation of the government affected all aspect of education even teacher education. In in-service teacher education programs teachers receive theological instruction such as reading holy Quran and the interpretation of it because the government thinks that whatever human beings do should serve God, therefore it is very difficult to overcome this orientation. ECDF provides teachers a golden opportunity to construct and share professional knowledge rather than theological preaches. Through ECDF, teachers are given voices and this minimizes teacher isolation which is warned by (Mercado & Baecher, 2014).

The results of log analysis also indicated that teachers acknowledged that for successful e-learning, there are a number of requirements which are in accord with what Chua and Chua (2017) suggest. Their suggestion entails that the success of e-learning and its quality depend on the quality of e-leadership and e-leaders need to take into accounts platforms by which teachers' become ready, feel the need for technology use and cultivate the culture of it. Besides, log analysis indicated that teachers were fully aware of the sources of the problem. They believed if policy makers intend to initiate any changes and implement technology in education, they need to implement e-platforms and consider the infrastructure otherwise a digital divide will be created as a result of Iran's haphazard distribution of

broadband, connectivity and internet quality (Rabiee et al., 2013) makes privileged few at the advantage of others.

In addition, log analysis indicated that teachers were not satisfied with the quality of the discussions on ECDF at beginning of the study because the teachers were conservative in sharing the information and recognizing the problems and suggesting solution. They were also not content with unity of the group members and leadership. But later they become more open to each other's idea and recognize each other as members of community scaffolding and assessing each other to advance teacher quality. The log analysis also indicated that teachers proposed cultivation of leadership and group work before any collaborative work is initiated. Besides, general propensity of Iranians toward someone mentoring them especially in educational context was quiet obvious in their suggestion of mentoring supervisor. Teachers consider watching videos as helpful but not to the extent of focused feedback from professional mentors on them. This accords what Stones (2002) reiterated in his study of the role of supervision in teacher education that watching videos without professional focused feedback is of little value.

Another factor suspected for teacher change in competences measured on TBSC and backed up in log analysis of ECDF is feedback. Teachers considered feedback they received in e-collaborative discussion forum on the video-based teaching practice they observed and their reflective comparison with their own teaching, their peers' critical reflection, comments and feedback on each, was a golden opportunity for them to identify the strength and deficiencies of their teaching. Teachers argued that the feedback they have on their teaching are just from student perspective and they are more on close ended likert scale evaluation forms and their good will and sometime supervisors drop in observations for promotion or checking upon complaints on student or parents sides which provide no qualitative comments on teacher improvement. They invited more professional coaching feedback. They criticize lack of systematic and clear framework for feedback and its delivery and evaluation of its implementation. Teachers attributing importance to the effect of feedback are in line with the importance given to feedback in literature on teacher improvement (Gormally et al., 2014; Kimball, 2002; Park et al., 2014; Price et al., 2010; Voerman, 2014; Zaare, 2013). Despite the common view in Iran that teachers are the presidents in the class, teachers welcome non-threatening and supportive school leadership which can scaffold them.

Another theme elicited from the log analysis is the change item. The first change is at ideological level which rests on the appreciation teachers have of the progress they made and the plan for future changes. Being connected with discourse community established teachers' sense of plausibility and gave an authoritative air to the teachers to make principled changes and manage the consequences of those changes. This type of change is initiated by a reconsideration of identity as Hallgarten (2002) puts forward. The comparison in the log analysis of ECDF indicated how teachers' points of concerns changed from entry to exit in the present teacher education program. Their idealized self-centered concern about teachers shaped from the years that they had spent as students themselves was changed toward more students centered one. They provided comments urging the consideration of students' emotional and social needs and suggested technical advices on more student centered activities such as conference writing and collaborative writing. These findings further support the findings of several study which hold the idea of identity change as a result of teacher education and reflection (Chong et al., 2011; Friesen & Besley, 2013; Grow, 2011; Lee & Jo, 2016; Lerseth, 2013; Oruç, 2013; Yuan & Burns, 2017). The other change occurred at psychological level. In addition to ideological change in teachers, teachers' video-based teaching practice and collaborative discussion changed teachers psychologically. Log analysis of ECDF indicated that teachers' frustration at the entry to

this electronic teacher induction gave its place to a sense of confidence at the exit level. Teachers claimed that the ample good teaching model they received in profession video gave them a sense of clarity and confidence in the teaching they do which is in line with studies by Ertmer and Ottenbreit-Leftwich (2010) and Tripp and Rich (2012) which investigated how technology helps teachers gain confidence and integrate technology to the best benefit of students and how teaching competences are changed as a result of changes in teacher confidence (Prasad, 2014). Another psychological theme elicited in log analysis is that teachers declared that they had more motivated to be an agent of change because they believed the possibility of change is not far from mind and the professional advancement can be initiated by positive support of institution authorities; the idea supported by Bjekić et al. (2014) and a review study of Han and Yin (2016).

At technical level, the log analysis also indicated that teachers attended classroom management and discuss about high-quality classroom management skills such as positive reinforcement, error correction techniques and elicitation techniques and probes to avoid self-asked questions and invitation for more student engagement. The effect of teacher induction on technical level supported in this study is consistent with other related study findings including those of Akalin and Sucuoglu (2015), Caires and Almeida (2005), Kennedy et al., (2017).

6 Conclusion and implications

This study set out to determine the effect of professional video-based teaching practice induction on teacher competences measured on TBSC and backed up with log analysis of e-collaborative discussion forum.

One significant finding to emerge from this study is that quantitative measures on TBSC shown professional video induction improved teacher learners' technical and clinical competences in comparison critical and personal competences from learning and growth perspective. Several teacher attended themes were elicited from log analysis of teacher electronic collaborative discussions including reflection and critical appraisal of observing professional video-based teaching practice, future vision of change in teaching both at ideational and psychological levels, the requirements of initiating changes both at local classroom teaching and global policy making level, revisiting the leadership and considering teachers as members of discourse community by giving them some voices and by providing non-threatening and supportive platform.

Despite the corroborations among the present study and well-documented literature on video-based teaching practice and teacher change, this research failed to investigate if mediating factors affected the results. According to Kreijns et al. (2013), what stimulates teachers' use of ICT in classrooms and mediation analysis indicated that teachers' attitude, self-efficacy and subjective norms affect teachers' integration of technology into their classes. Since the only criteria for the inclusion of the participants of this study were participants working experiences, their institution of service and their instructing curriculum, it is recommended that association of the mediating factors with construct under this study is investigated in further research. In addition, as urged in the teacher electronic collaborative discussion and also supported by Wang and Antonenko (2017), a mentor could have better directed teachers in their discussion and could pave the way for professional comments. Further research might explore how the results of the study are mediated by presence of a mentor. Moreover, the teachers found the videos very helpful, they suggested

more use of video-based evidence of Iranian teaching cases. As Pirkkalainen et al. (2017) set forth, the emotional ownership teachers have toward evidence-based teaching should be taken into account. Accordingly, further research is invited to investigate the effect of self or peer videos rather than professional ones on teacher competences.

Despite the limitations the study has, the findings have important and significant implication. The implication of this study is that electronic teacher induction can serve not only as a medium for knowledge construction and sharing but also for solution based implementation of knowledge. Therefore, technology induction mediums in teacher education classes can be like a clinic for solving teaching related problems. Besides, it can provide a non-threatening and supportive medium for teachers' formative and summative evaluation which can fulfill the principles of dynamic assessment in illuminating if teachers meet the standards, left behind or adjust them. Technology induction mediums like that of the present research can help teachers revisit their identity as a teacher, build up their self-confidence and motivation, establish their teaching efficacy through the scaffolding they receive. In other words, it can help teachers to cover their zone of proximal development by noticing the gap between the teaching that do and good teaching practices.

Declarations

Conflict of interest The authors declare that they have no competing interests.

Consent for publication Authors adhere to the Journals Copy Right and publication policies.

Ethical approval Research ethical issues were established and acknowledged in this research.

Informed consent This research involves human participants, and informed consent was recognized and acknowledged in this research.

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