Building blocks of instructor professional development for innovative ICT use during a pandemic

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Abstract

Purpose – Innovative use of information and communications technology (ICT) requires (new) knowledge and skills for the group that has the biggest impact on the quality of education: instructors. Facilitating professional development (PD) of instructors is crucial for the quality of one's education system(s), perhaps even more so in times of a pandemic.

Design/methodology/approach – Based on the authors' analysis of reviews published in the last decade, this paper summarizes the key building blocks of effective PD on the innovative use of ICT during a pandemic. The authors used these building blocks to reflect on two national PD initiatives developed to support institutions of higher education in instructional use of ICT while dealing with the consequences of the COVID-19 pandemic.

Findings – Both PD initiatives include the same building blocks: (1) content-related building blocks focused on technological knowledge, (2) active learning and expert-supported PD (didactics-related building blocks) and (3) contextual building blocks consisting of clearly defined goals focused on the instructor's own practice, use of technology, sustained duration (e.g. taking place over a longer period of time) and evidence-informed PD. One contextual building block that was not evident in the reviews but emerged as a vital building block is "responsiveness" to the situation and needs of the participants.

Originality/value – High-quality PD is crucial if one wants to safeguard the quality of (online) instruction and learning to ensure high-quality education for all students. This paper can contribute to enhancing the quality of much-needed PD on online teaching (during, but also after COVID-19).

Keywords Instructor professional development, COVID-19, Higher education, Information and communications technology (ICT) in education

Paper type Viewpoint

Introduction

For several years, universities around the world have worked on educational innovation involving information and communications technology (ICT) (Kirschner *et al.*, 2004; Rienties *et al.*, 2013; Shen and Ho, 2020). However, they have been struggling with their digitalization strategies and especially with prioritizing the modernization of courses and teaching using ICT. Most universities have had a few forerunners: pioneering instructors who are ahead of

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the game, constantly updating their own teaching using the latest technological opportunities. However, the majority of instructors did not follow these forerunners. Moreover, a number of instructors made little to no use of ICT in their education. That is, until (almost) the entire world population was forced into online teaching as a result of the COVID-19 pandemic (Hodges *et al.*, 2020), which requires the innovative use of ICT.

Innovative use of ICT requires (new) knowledge and skills for the group that has the biggest impact on educational quality: instructors. Facilitating professional development (PD) for instructors is crucial for the quality of our education, perhaps even more so in times of a pandemic. Numerous reviews on effective building blocks of PD exist (e.g. Borko, 2004; Desimone, 2009; Timperley *et al.*, 2007). Based on our analysis of reviews published in the last decade, this paper summarizes the key building blocks of effective PD on the innovative use of ICT during a pandemic. Using these building blocks, we created a framework that can be used to analyze (the effectiveness of) PD initiatives. Subsequently, we used this framework to reflect on two national PD initiatives developed to support institutions of higher education in instructional use of ICT while dealing with the consequences of the COVID-19 pandemic. High-quality PD is crucial if we want to safeguard the quality of (online) instruction and learning to ensure high-quality education for all students.

Context

The pandemic accelerated the use of ICT, which was already a priority in the Netherlands. In 2019, the Dutch Association of Universities, the Association of Universities of Applied Sciences and SURF (the collaborative organization for ICT in Dutch education and research) initiated the four-year "Acceleration Plan for Educational Innovation with ICT" (Association of Universities, Association of Universities of Applied Sciences, and SURF, 2018). The program focuses on bringing together initiatives, knowledge and experiences to support digitalization. In total, 39 higher education institutions participate in this program. The goals of the Acceleration Plan are: (1) improved connection with the labor market, (2) more flexible education and (3) improved and enhanced learning with ICT.

Eight thematic "zones" (i.e. teams consisting of representatives from participating institutions of higher education) are working on realizing these goals. Recognizing the importance of investing in and building professional capital, one of the themes is facilitating PD for instructors. In this zone, 19 universities are collaborating on improving PD for instructors in Dutch higher education. Their shared goal is to enable all instructors to make effective use of ICT in delivering instruction to their students. Accelerating educational innovation can improve educational quality.

A framework for analyzing PD

Guskey (2002) defined PD as "systematic efforts to bring about change in the classroom practices of teachers [1], in their attitudes and beliefs, and in the learning outcomes of students" (p. 2). Based on several reviews [2] in the field of PD (on educational innovation using ICT) published between 2010 and 2020, we developed a framework (see Figure 1) of important PD building blocks, organized according to the main constituents of instructional design theories (e.g. see Reigeluth and Carr-Chellman, 2009).

Content	Didactics	Context
Content Knowledge (CK)	Active learning	Clearly defined goals
Pedagogical Content Knowledge (PCK)	Collaborative learning	Teachers' own practice
Technological Knowledge (TK)	Expert-supported PD	Use of technology
		Duration and intensity
		Evidence-informed

Figure 1.
The building blocks of effective PD

Content

According to several reviews, to be more effective, the PD content should focus on *content knowledge* of the subject the teacher is teaching (Cordingley *et al.*, 2015; Darling-Hammond *et al.*, 2017; Horvers *et al.*, 2020; Postholm, 2012; Van Veen *et al.*, 2011). However, focusing only on content is not enough (Hubers *et al.*, 2020; Kennedy, 2016). *Pedagogical content knowledge*, concerning knowledge about how to support students in learning about the subject matter, needs to be included in the PD (Cordingley *et al.*, 2015; Darling-Hammond *et al.*, 2017; Dogan *et al.*, 2016; Horvers *et al.*, 2020; Postholm, 2012; Van Veen *et al.*, 2011). Cordingley *et al.* (2015) stated in this light that it is crucial that teachers have insight into how students learn the content offered, understand what students struggle with and are aware of common misconceptions. A focus on *technological knowledge* (or ICT literacy) is specific for PD on the use of ICT: combining technology knowledge with (pedagogical) content knowledge so that teachers can make informed decisions with regard to the use of technology to improve the development and delivery of instruction (Horvers *et al.*, 2020). Knowledge about the intersection of technology and pedagogical content knowledge is commonly referred to as technological pedagogical content knowledge (TPACK, Mishra and Koehler, 2006; Rienties *et al.*, 2013).

Didactics

Active learning is an important building block of effective PD (Avalos, 2011; Borko *et al.*, 2010; Darling-Hammond *et al.*, 2017; Dogan *et al.*, 2016; Elliott, 2017; Gerard *et al.*, 2011; Horvers *et al.*, 2020; Hubers *et al.*, 2020; Kennedy, 2016; Postholm, 2012; Van Driel *et al.*, 2012; Van Veen *et al.*, 2011). Examples of active learning include teachers sharing and discussing their experiences, observing and reflecting on (their own/expert) lectures, providing each other with feedback, studying and discussing student work, using evidence and data to improve teaching and experimenting (Cordingley *et al.*, 2015; Darling-Hammond *et al.*, 2017; Elliott, 2017; Gast *et al.*, 2017; Horvers *et al.*, 2020; Hubers *et al.*, 2020; Van Veen *et al.*, 2011). Experimenting often involves an inquiry/research aspect, including the analysis, investigation and discussion of these experiments to determine what does and does not work (Borko *et al.*, 2010; Dogan *et al.*, 2016; Horvers *et al.*, 2020; Van Veen *et al.*, 2011). Using a variety of formal and informal learning activities is also important. Each teacher has different needs, and PD participants need to be able to choose from a variety of activities in order for these needs to be better met (Cordingley *et al.*, 2015; Elliott, 2017; Horvers *et al.*, 2020).

Moreover, *collaborative or team-based learning* has been identified as important for effective PD (Avalos, 2011; Borko *et al.*, 2010; Cordingley *et al.*, 2015; Darling-Hammond *et al.*, 2017; Dogan *et al.*, 2016; Elliott, 2017; Gast *et al.*, 2017; Gerard *et al.*, 2011; Hubers *et al.*, 2020; Kennedy, 2016; Postholm, 2012; Van Veen *et al.*, 2011), for example, in the form of professional learning communities or professional learning networks. During collaboration, teachers can share, discuss and reflect on their own experiences. Collaboration can lead to a shared sense of responsibility for the PD, commitment to achieving the goals set in the PD and learning (Darling-Hammond *et al.*, 2017; Horvers *et al.*, 2020; Van Veen *et al.*, 2011). Moreover, working together can lead to positive changes in the culture and instruction of the department, faculty and/or entire organization (Darling-Hammond *et al.*, 2017). It must be noted here that Cordingley *et al.* (2015) and Kennedy (2016) found that collaboration does not guarantee success. According to Kennedy (2016), it is the content these groups discuss and the nature of intellectual work they are engaged in that matters.

Expert-supported PD in the form of coaches, mentors or other experts is also an important characteristic of effective PD (Borko *et al.*, 2010; Darling-Hammond *et al.*, 2017; Gast *et al.*, 2017; Postholm, 2012). Coaches or mentors, often teachers themselves, play a critical role, for example, in modeling strong instructional practices or supporting group discussion and

collective analysis of student work (Borko *et al.*, 2010; Darling-Hammond *et al.*, 2017). Coaches, sometimes in the form of (external) researchers, can support and guide teachers in their PD activities, provide insight into how to learn from experience in practice and present theory about teaching (Postholm, 2012). External coaches or experts can provide multiple and diverse perspectives and can challenge orthodoxies, which is needed for learning (Cordingley *et al.*, 2015). However, the review by Kennedy (2016) also showed that the value of coaches varies. More effective coaches seem to be less prescriptive and collaborate with teachers on lesson planning, providing a model of strategic planning (Kennedy, 2016).

Context

One contextual building block is the importance of working toward *clearly defined goals* (Cordingley *et al.*, 2015; Gast *et al.*, 2017; Horvers *et al.*, 2020) that are collaboratively created and congruent with the individual goals of the PD participants (Horvers *et al.*, 2020; Van Veen *et al.*, 2011). Teachers need to be supported in framing their own questions and goals related to their own practice. The knowledge and skills learned in the PD can then be directly used in teachers' own contexts, which contributes to the transfer of what has been learned. These goals should be related to student learning (Borko *et al.*, 2010; Cordingley *et al.*, 2015; Dogan *et al.*, 2016; Horvers *et al.*, 2020; Hubers *et al.*, 2020; Van Veen *et al.*, 2011).

Furthermore, the PD needs to *focus on the teachers' own practices* for it to address the teachers' needs (Avalos, 2011; Borko *et al.*, 2010; Cordingley *et al.*, 2015; Elliott, 2017; Gast *et al.*, 2017; Horvers *et al.*, 2020; Hubers *et al.*, 2020; Kennedy, 2016; Van Driel *et al.*, 2012). Elliott (2017) defined this as interest-driven and differentiated PD. Teachers need to be able to apply directly what has been learned in the PD. Having PD be aimed at teachers' own practices also implies the PD should include authentic learning situations (Avalos, 2011; Horvers *et al.*, 2020). It must be noted here that the focus should be on teachers' own practice, but the PD does not necessarily have to take place at the participants' own institution (i.e. workplace learning). As pointed out by Van Driel *et al.* (2012), there are effective workplace-based PD interventions, as well as effective off-site PD interventions.

Two reviews pointed to the benefits of using *technology* in the PD itself. Effective use of technology can enhance learning. Examples here include discourse and content analysis to study teachers' discussions of videos in video clubs, online forums and support, online video case discussions and the use of classroom video for teaching and learning (Avalos, 2011; Borko *et al.*, 2010).

Duration or intensity of the PD is another important factor to consider (Borko *et al.*, 2010; Cordingley *et al.*, 2015; Darling-Hammond *et al.*, 2017; Elliott, 2017; Gerard *et al.*, 2011; Hubers *et al.*, 2020; Postholm, 2012; Van Driel *et al.*, 2012; Van Veen *et al.*, 2011). Sustained duration of the PD is important, as effective PD provides teachers with ample time to learn, practice, implement and reflect upon newly learned strategies for their teaching (Borko *et al.*, 2010; Darling-Hammond *et al.*, 2017). It is unclear exactly how much PD is needed. Results range from 14 to 100 h as a minimum for effectiveness (Postholm, 2012; Van Driel *et al.*, 2012; Van Veen *et al.*, 2011). Van Veen *et al.* (2011) concluded that what all these studies have in common is the substantial time needed, in terms of contact hours as well as in terms of the duration of the PD. In general, short-term interventions (e.g. one workshop) appear to be less effective than long-term interventions combined with continuing follow-up support (Van Driel *et al.*, 2012). Most importantly, the duration needed depends on the goals of the PD, the type of activities in the PD (Van Driel *et al.*, 2012) and how the time is used (Cordingley *et al.*, 2015; Hubers *et al.*, 2020).

Finally, PD interventions are more likely to be effective when they are *evidence-informed* (Elliott, 2017; Darling-Hammond *et al.*, 2017; Hubers *et al.*, 2020; Kennedy, 2016; Van Veen *et al.*, 2011). The content in the PD should be based on theory and evidence addressing

methods and practices. Every intervention should be designed using strategies grounded in sound learning theory (Elliott, 2017) and include a theory of improvement: validated and explicit reasoning about why the intervention will contribute to the learning of teachers (theory of change) and students (theory of instruction) (Cordingley *et al.*, 2015; Hubers *et al.*, 2020; Kennedy, 2016; Van Veen *et al.*, 2011).

Two cases

When the universities in the Netherlands had to switch to online education due to the COVID-19 pandemic, two national PD initiatives were designed and implemented within a week to support professionals in higher education in this transition. We will first describe both initiatives (see also Table 1) and then use the building blocks presented in this paper to compare both initiatives (see Table 2).

Case 1: Vraagbaak

The first PD intervention we will describe consists of the activities of the "*Vraagbaak Online Onderwijs*" (roughly translated as "Information source for Online Education": https://communities.surf.nl/group/59). This online environment was set up in the first days of the sudden transition to remote teaching and learning. At first initiated by SURF (the collaborative organization for ICT in Dutch education and research), the Vraagbaak rapidly grew within one week to a collaborative initiative by the Association of Universities and the Association of Universities of Applied Sciences, the Acceleration Plan and the Comenius network (network of educational innovators in the Netherlands). This made it possible for virtually every professional at a Dutch institution of higher education to contribute their expertise and experiences to the *Vraagbaak*. That was also its aim: to share knowledge between organizations.

The activities, managed by a coordination team, include a website that allows professionals from universities to write and share articles and to comment on contributions posted by others. The website is organized around thematic pages (i.e. facilitating and supporting instructors, inclusive online education, (open) educational resources, use of video, remote testing and assessment, software and tools and digital didactics). Dedicated editors manage and update the information on a daily basis. A selection of articles is translated into English. By the end of May 2020, 100 articles were posted on the website, with a total of 38,242 views (for more information, see Table 1).

Furthermore, the Vraagbaak organizes webinars with and for the Dutch higher education community. The first webinar took place on March 18, 2020; by the end of May, ten more

Website	Page views	
	Total views	Unique views
*Vraagbaak	38242	28240
*DDguide	105689	87895

Webinars	Attendees			Recording playbacks		
	N	*M*	SD	*N*	*M*	SD
*Vraagbaak	1427	130	69	796	133	99
*DDguide	1974	247	112	184549	23069	6561

Note(s): count as of June 4, 2020. DDguide organized eight webinars between March 17 and 30. Vraagbaak organized 11 webinars between March 18 and May 15; five Vraagbaak webinars were not recorded

Table 1.
Descriptive statistics for the PD initiatives

Building block	Vraagbaak	DDguide
Content knowledge	The Vraagbaak serves all disciplines. Therefore, subject-matter content is not a focus of the Vraagbaak. However, several themes are illustrated with examples from different types of practice, making the relationship with domain-specific knowledge evident	DDguide serves all disciplines. The content of DDguide focuses on didactics in online education. It presents mainly knowledge about the intersection of pedagogy and technology, which is often referred to as technological pedagogical knowledge (TPK). Theory is illustrated through examples from different types of practice, making the relationship with domain-specific knowledge evident (TPACK, see also Rienties *et al.*, 2013)
Pedagogical content knowledge	This is not a specific aim of the Vraagbaak	PCK is part of the TPACK examples. However, this is not a specific aim of the DDguide
Technological knowledge	One of the themes (digital didactics) focuses specifically on ICT literacy	The focus of DDguide is on digital didactics. That means a combination of technology (ICT) and pedagogy. ICT tool use (e.g. the virtual classroom) is explained in the context of pedagogy (e.g. synchronous online collaborative learning)
Active learning	The Vraagbaak's webinars invite attendees to participate in Q&A sessions and to share their experiences. The chat function is widely used. The Vraagbaak's community site itself extends an invitation to contribute, although it must be said that not much interaction is taking place. The forum function that was installed is barely used. However, the content shared through the Vraagbaak should be a starting point for active learning by the participants in their own organizations	Active learning is mainly promoted through the webinars. Participants have the opportunity to pose questions and address relevant issues in the chat. Questions can also be asked via a form that can be activated on each web page of DDguide. Further, instructors can participate in discussions in various social media that can be consulted. Finally, the content shared through DDguide should be a starting point for active learning by the participants in their own organizations
Collaborative learning	The webinars can be considered a form of team-based learning, albeit the level of discussion, collaboration and combined reflection is relatively low due to the nature of a webinar setup. On the topic of online proctoring a specific community of 200 members was created	DDguide does not promote collaborative or team-based learning. Information in DDguide and the activities organized can be used as incentives for these forms of learning
Expert-supported PD	Almost all activities are based on the contribution of external experts. Expert knowledge is presented in published articles, in webinar presentations and in references within these articles and presentations. When organizing webinars, the aim is to combine multiple examples or viewpoints	Experts (both educational researchers and educators) provide information for DDguide that is based on (a review of) research
Clearly defined goals	Vraagbaak aims at sharing knowledge and expertise to best support the transition to online education	DDguide aims at sharing knowledge on the didactics of online education

Table 2.
Comparison of the two PD initiatives

(*continued*)

Building block	Vraagbaak	DDguide
Teachers' own practice	Content is tailored as much as possible to the (expected) needs of instructors and other professionals (e.g. learning designers, IT staff) in higher education	Content is tailored as much as possible to the (expected) needs of instructors in regular (higher) education
Use of technology	The Vraagbaak in itself is an example of the use of technology within a (professional) learning environment. However, the technologies used for the website mostly support one-way communication and, although they allow the opportunity to share, do not invite participants to discuss and reflect. The webinar supports exchange via chat; this is widely used	Technology and pedagogy are central to DDguide. In some webinars (e.g. virtual reality), participants have the opportunity to experience technology (and pedagogy) in after-webinar sessions. Webinars are presented in a virtual classroom setting. As such, participants experience simple forms of synchronous online learning
Duration and intensity	Vraagbaak is a source of information and a portal for synchronous learning opportunities (i.e. webinars). The duration of the webinars is brief (1 h). As such, they might be regarded as "one-shot instruction" sessions. The duration of more informal kinds of learning via website consultation is difficult to determine	DDguide is a source of information and a portal for synchronous learning opportunities (i.e. webinars, social media). The duration of the webinars is brief (1 h). As such, they might be regarded as "one-shot instruction" sessions. The duration of more informal kinds of learning via website consultation or use of social media is difficult to determine
Evidence-informed	When constructing the Vraagbaak, no time was taken to consult evidence about what interventions may be most effective. However, SURF and the Acceleration Plan had gathered expert knowledge on professional development in the past year, and this was taken into account when starting the Vraagbaak. For example, the focus on sharing practices was deliberate, because it is known that transfer to participants' own practices is facilitated	Information presented by DDguide is evidence-informed. DDguide informs teachers in a classical way: the focus is on providing information and expertise. There are opportunities for active learning (webinars, social media), but these are relatively scarce. Modern (proven) technology is used for providing and discussing information

Table 2.

webinars had followed, and a further eight were planned for (or occurred in) June. Each webinar is recorded and posted on the website, and a written summary is posted on the community site afterward. The aim of the webinars is to share expertise and experiences between professionals. Subjects vary from how to organize online interaction with students to how to implement online proctoring. The webinars had a total of 1427 attendees (see Table 1).

The Vraagbaak includes one of the content-related building blocks, namely technological knowledge. The Vraagbaak includes the following didactics-related building blocks: active learning and expert-supported PD. It includes four contextual building blocks: clearly defined goals, focus on teachers' own practice, use of technology and evidence-informed PD (for more information, see Table 2).

Case 2: DDguide

The second PD initiative is DDguide (www.ddguide.nl; DD is an abbreviation of "digital didactics"), a website launched by the Open University of the Netherlands (OUNL). The aim

of the website is to guide instructors as they move from a campus-based teaching environment to a fully online setting for learning and instruction. It provides information about developing, implementing and facilitating teaching and learning in an online environment. The website was set up in just a few days, with the help of a large group of staff representing various organizational units. The DDguide website provides theory on all facets of online education, such as the guidance of students (i.e. supervision, feedback and motivation) and assessment of learning. The theory is explained through examples from the OUNL's own online educational practice (cf. Schlusmans *et al.*, 2016). The DDguide website was visited more than 100,000 times between March 16 and June 4, 2020 (see Table 1).

Besides the continually growing repository of information on online digital didactics, DDguide is also a portal to a series of webinars, social media and brief online courses on online education. In the first two weeks of the lockdown of higher education institutions in the Netherlands, eight webinars were organized on topics such as motivating students in online learning, summative assessment in online learning, supporting students in asynchronous and synchronous online learning and designing multimedia for online learning. Approximately 2000 instructors and educationists joined the webinars; their recordings of these sessions were viewed over 180,000 times (see Table 1). Social media have been used from the start to respond to questions from instructors and to anticipate developments in the transformation of regular institutions to online education. Finally, instructors could attend a series of brief learning courses that were developed for instructors and educationists in the Netherlands in 2019 (Wopereis *et al.*, 2019).

The DDguide includes exactly the same PD building blocks as the Vraagbaak, namely one content-related building block (technological knowledge), two didactics-related building blocks (active learning and expert-supported PD) and four contextual building blocks (clearly defined goals, teachers' own practice, use of technology and evidence-informed PD) (see Table 2).

Discussion: a reflection on both PD initiatives

The framework with the building blocks for effective PD described in this paper can be used as a tool to reflect on PD initiatives (developed during a pandemic or not). Several of the building blocks described in this paper have been used in the two national PD initiatives (see Figure 2). Although the PD initiatives described are not "traditional" PD interventions, for example, in the form of a course, coaching or participation in a professional learning community, the aim of both initiatives is to improve instructors' practices and student learning. This is in line with a commonly used definition of effective PD: "Structured professional learning that results in changes in instructor practices and improvements in student learning outcomes" (Darling-Hammond *et al.*, 2017, p. v).

The question here is whether the PD initiatives described in this paper are likely to be effective in terms of changes in instructor practices and improvements in student learning outcomes. As both PD interventions incorporate several of the effective PD building blocks

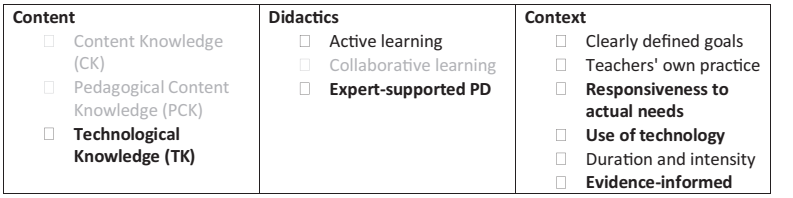

Figure 2.
Reflection on the building blocks of two Dutch PD initiatives during a pandemic (*crucial*, important, less important)

(i.e. technological knowledge, active learning, expert-supported PD, clearly defined goals, focus on teachers' own practices, use of technology, longer duration and developed in an evidence-informed manner), we are hopeful that these PD initiatives will contribute to lasting changes in instructor practice, as well as improvement in student learning.

Content-related building blocks

Strikingly, two content-related building blocks were not used in either PD initiative: content knowledge (CK) and pedagogical content knowledge (PCK). Both initiatives serve all disciplines and are mainly aimed at technological knowledge. This makes sense during a pandemic, when all teaching suddenly needs to be online. CK and PCK are also harder to address when the target audience consists of all higher education instructors in the Netherlands (i.e. 50,000 instructors) as well as, for example, learning designers and coaches assisting instructors. These building blocks may be difficult to cover in national initiatives with a general focus and should be covered by the instructors' organizations. Ideally, however, PD initiatives that focus on facilitating the transition from campus-based education to online education should focus on interventions at the intersection of technology, pedagogy *and* content (TPACK; technological pedagogical content knowledge, Mishra and Koehler, 2006; Rienties *et al.*, 2013). However, developing such domain-specific interventions takes time, which was lacking. In order to mature, higher education should find the resources to transform the emergency-centered initiatives into comprehensive TPACK-focused PD programs.

Didactics-related building blocks

With regard to effective building blocks during a pandemic, our reflection shows that some of the PD building blocks may be more important than others. Expert-supported PD seems to be a key building block. Almost all activities in the PD initiatives rely on the contributions of experts (educational researchers, educationists), in providing both content (e.g. the website) and input for the webinars. Educational practices at the OUNL, for instance, served as examples to inform instructors at other institutes of higher education about online learning. SURF collected similar expert practices concerning online learning from various institutions of higher education in the Netherlands, with the aim of sharing them. As such, example-based learning proved to be an important guiding principle in shaping the two PD initiatives (cf. Van Gog and Rummel, 2010). Experts got together to support the community in the transition to online teaching and learning. When providing PD on a national scale in a very short amount of time, this can be considered to be one of the key building blocks.

One other observation concerning the didactics-related building blocks is that collaborative learning was not addressed in the PD initiatives. This building block is difficult to incorporate in an emergency situation, where the focus is on knowledge sharing, dissemination and modeling. However, collaborations were formed via the website, webinars and social media, often related to specific topics (e.g. learning communities and networks and special interest groups were formed).

Moreover, some building blocks may take a different shape during a pandemic. In both PD initiatives, active learning did not take place in any of the (often face-to-face) forms found in the literature (e.g. instructors observing and reflecting on (their own/expert) lectures, providing each other with feedback, studying and discussing student work), but was promoted through active participation in the webinars using the chat function and through the use of social media (i.e. through the use of technology). Both PD initiatives also aim to be a starting point for further active learning within the participants' teaching contexts, as this is where the learning needs to take place.

Contextual building blocks

The content of the PD was tailored as much as possible to the needs of the instructors, but this often concerned the expected needs. Participants can take the PD offered by these national initiatives as a starting point for further PD within their own organizations. Because of the large scale of both PD initiatives, the PD could not be tailored to the needs of each individual. This is also evident in the goals of both initiatives, which are described in terms of knowledge sharing and knowledge dissemination. Both initiatives focus on sharing knowledge and expertise (e.g. on the didactics of online education) to support the transition to online education.

One contextual building block that was not evident in the reviews but emerged as a vital building block of both PD initiatives described in this paper is "responsiveness." During a pandemic, PD needs to focus on and respond constantly to actual needs of instructors. This includes responsiveness to PD users' *unique situations and their needs*. This is already reflected to some extent in the building block "focus on teachers" own practices but moves beyond that. For example, it also addresses needs instructors may not even be aware of yet. Responsiveness to *context* is also key, for example, how to deal with new rules and regulations. Both PD initiatives described in this paper made use of social media to uncover some of these needs. Moreover, both initiatives could make use of an enormous network (of experts and expertise) to access the required expertise to address these needs.

Although the use of technology was only mentioned as important in two of the reviews consulted, during a pandemic PD cannot take place without the use of technology (e.g. in the form of a website, webinar and online courses). The use of technology can be considered as another crucial building block. Although both initiatives were developed very quickly, they both incorporate the evidence-informed building block. Both initiatives have experts sharing and disseminating knowledge based on research (and their own experiences). During a pandemic, collaboration and knowledge sharing (instead of every person reinventing the wheel) are more crucial than ever to build the capacity of all instructors involved in providing online education.

The duration and intensity of the participation are difficult to determine for both PD initiatives. The initiatives are mainly sources of information and portals to synchronous learning opportunities. The question remains whether participating in webinars and consulting information on websites is more than "one-shot instruction" and whether it can be viewed as a first step in longer PD trajectories.

Effectiveness and sustainability of the PD initiatives

The aim of this paper was to reflect on two national PD initiatives. Important questions that need to be answered next concern: How effective are both PD initiatives and are the PD initiatives going to be less effective in terms of enhancing the quality of instruction and learning, because some building blocks were not taken into account or were shaped differently? Furthermore, it is not only important to study the effectiveness of PD initiatives as described in this paper; it is also important to study their sustainability (i.e. sustainability of the initiatives as well as the goals of the initiatives). Sustainability is often not studied (Van Driel *et al.*, 2012), and when it is studied, the results are often disappointing (e.g. Van Veen *et al.*, 2011). Moreover, PD interventions often lead to merely superficial changes, and people commonly go back to "business as usual" after the PD intervention has ended (Hubers *et al.*, 2020).

In general, we see so many great examples of online education around us, it would be a waste of human capital, time and money if all universities go "back to usual" when they reopen their physical doors. The question here is what happens when schools reopen? Will all

of the online learning disappear? Will more blended forms of learning arise? Will "hybrid curricula" emerge, in which online modules alternate with blended and/or face-to-face modules? It is important that, independent of the form of teaching and learning during or after a pandemic, we must ensure the quality of (online) didactics and learning to ensure high-quality education for all students. Continual high-quality PD and lifelong learning might be vital here. It is our hope that (the framework developed in) this paper can contribute to enhancing the quality of much-needed PD on online teaching (during but also after COVID-19).

Notes

1. In developing this framework, we analyzed reviews from primary, secondary and higher education. In primary and secondary education, the term *teacher* professional development is most commonly used. In higher education, the terms *instructor* and *lecturer* professional development are most commonly used. In this section, we use the term teacher to refer to primary, secondary and higher education. In using this framework to analyze the two PD initiatives in the Netherlands, we use the term instructor, as this refers to higher education only.
2. Avalos (2011); Borko *et al.* (2010) Cordingley *et al.* (2015); Darling-Hammond *et al.* (2017); Dogan *et al.* (2016); Elliott (2017); Gast *et al.* (2017); Gerard *et al.* (2011); Horvers *et al.* (2020); Hubers *et al.* (2020); Kennedy (2016); Postholm (2012); Van Driel *et al.* (2012); Van Veen *et al.* (2011).

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