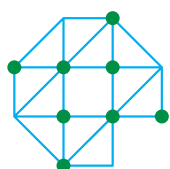


Building blocks for effective lecturer professional development in higher education aimed at educational innovation with IT

Version 2.0



Acceleration plan
Educational innovation
with ICT



Facilitating professional
development of lecturers



Building blocks for effective lecturer professional development in higher education aimed at educational innovation with IT

Version 2.0



Acceleration plan
Educational innovation
with ICT

Acceleration Plan – Educational Innovation with IT

Kim Schildkamp

Dorien Hopster-den Otter

Marlies ter Beek

iXPERIUM
CENTRE OF EXPERTISE

iXperium/Centre of Expertise for Learning with IT

Dana Uerz

Anne Horvers

Review Committee

Kees Ritmeester

Ronald Spruit

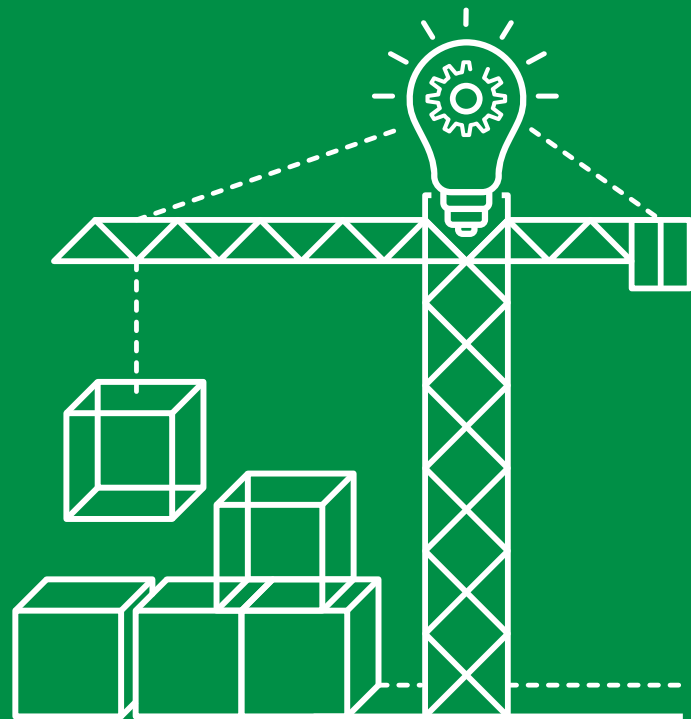
January 2021



This publication is released under the Creative Commons Attribution 4.0 licence.
Please cite this work with the following attribution: Schildkamp, K., Hopster-den Otter, D., ter Beek, M., Uerz, D., & Horvers, A. (2021). Building blocks for effective lecturer professional development in higher education aimed at educational innovation with IT. Version 2.0. Utrecht, the Netherlands: Acceleration Plan – Educational Innovation with IT.

Content

Introduction	5
Literature review	6
Model for the effective professional development of lecturers	7
Lecturer characteristics	10
Characteristics of professional development	14
Form/didactics	15
Content	19
Characteristics of the institution	20
Conclusion	25
References list	27
Experts consulted	30
Appendix	31
The set of building blocks	31



Introduction

Information technology is pervading society faster and deeper than ever before. The opportunities that IT offers are growing at a pace not yet seen. This has major consequences for how we all live, work and learn. Nobody can predict how the digital transformation will have changed the higher education landscape in ten years' time, but we know for sure that the digital transformation will have a major impact¹⁻³. The national measures taken in the early part of 2020 to combat the spread of the coronavirus (the cause of COVID-19) have meant that higher education institutions have had to make an overnight transition to online education. This means that many lecturers have gained experience in using IT resources in their teaching practice and, in all likelihood, have further developed their competencies. The effect of this transition on the ultimate need for professional development is still difficult to predict. It is expected, however, that the urgency for professional development activities will remain.

Even in a post-coronavirus world, attention will still need to be paid more than ever to how lecturers can develop their professional competencies in the field of educational innovation with IT, so that the acceleration we experienced in 2020 will become embedded in higher education and continue into the future^{4,5}. Educational innovation with IT is doubly innovative: professionals will have to learn to do new things using new resources. This goes beyond merely replacing work forms and resources with IT-based resources (substitution). It is a complex process that demands a deeper way of learning in which routines and their underlying knowledge and beliefs are explicitly reconsidered (modification and reformulation of the teaching).

The facilitation of lecturer professional development is one of the themes of the four-year Acceleration Plan for Educational Innovation with IT⁶. The Acceleration Plan is a collaborative venture between the Association of Universities in the Netherlands, the Dutch Association of Universities of Applied Sciences and SURF addressing the opportunities that the digital transformation offers higher education. There are three ambitions with regard to educational innovation with IT:

1. To improve alignment with the labour market;
2. To encourage more flexibility in education;
3. To make better and smarter use of technology.

The Acceleration Plan is divided into eight thematic zones and two working groups (these are teams, each consisting of representatives from higher education institutions)

that work together to help achieve these ambitions. The Facilitating professional development for lecturers zone is working to help institutions effectively assist lecturers in their institutions with professional development in the area of educational innovation with IT. Based on the collection of professional development strategies developed by the Zone and which have proven to be effective, institutions can start a process of improvement in order to achieve the desired acceleration in the field of educational innovation with IT within their own institution.

The Facilitating professional development for lecturers zone is working on five themes at the sectoral level, institutional level and the individual level as shown in the pyramid model in Figure 1. One of these themes is 'Effective professional development' for lecturers in which the Zone is investigating how to organise professional development activities for lecturers as effectively as possible. Institutions can build on the insights gained when designing their own professional development policies and activities.

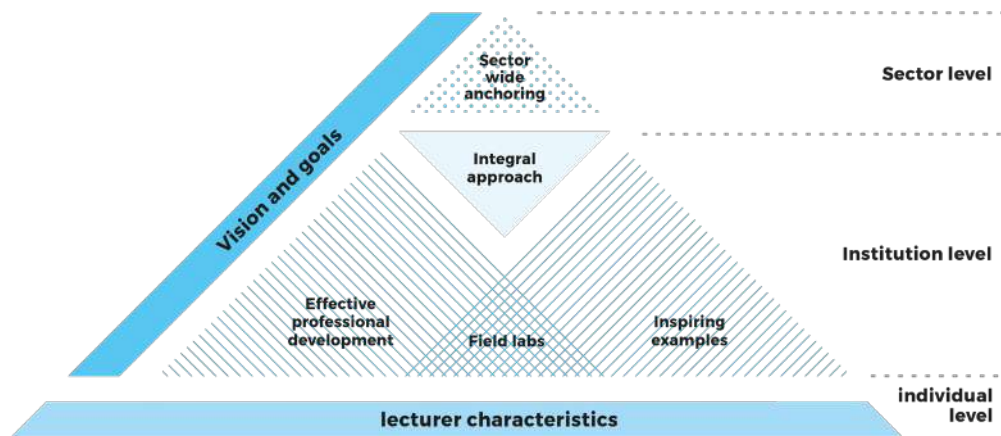
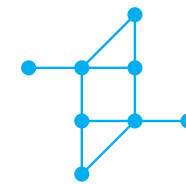


Figure 1. The pyramid model of the Facilitating professional development for lecturers zone.

Literature review

A great deal of research has been conducted into lecturer professional development in recent years across all sectors of the education landscape. Lecturer professional development is usually described as a 'systematic effort to transform the teaching methods of teachers, their views and ideas, as well as the learning outcome of students'^{7(p2)}. It is important to emphasise that lecturers are co-owners of their professional development and must be supported in this by their institutions⁸. Recent studies have identified various

effective components in the professional development of lecturers⁹⁻¹¹. Furthermore, the scientific literature in this field is increasingly focused on educational innovation with IT and how lecturers can be supported by this¹²⁻¹⁷. Literature on the specific effective characteristics of professional development in the higher education context is scarce, and there are very few studies that combine all three elements: 1) professional development of lecturers, 2) educational innovation with IT and 3) the context of higher education. This resulted within the Acceleration Plan to the following research question:



Which elements (building blocks) can be identified in the scientific literature and on the basis of expertise among educational practitioners when it comes to the effective professional development of higher education lecturers in relation to educational innovation with IT?

The Facilitation of lecturer professional development zone has commissioned research in order to arrive at a set of building blocks, supported by literature and practice, which institutions can use to design and evaluate effective professional development activities in the field of educational innovation with IT. In phase 1 of the study, an initial model¹⁸ was developed based on a literature review and conversations with subject-matter experts (see list of references). This model sets out the building blocks for effective lecturer professional development in higher education. The model has been used for a follow-up article on lecturer professional development during the Covid-19 pandemic in 2020⁵. In addition, various institutions have gained experience with use of the model in practice. This demonstrated the need for a more precise definition of some of the building blocks in order to improve their practical usefulness. For this reason, additional literature^{9,11,19-29} was sought in phase 2 of the study in order to clarify the definitions of the building blocks and to merge some building blocks together, where possible. This has resulted in a second, updated version of the model, which has again been submitted to the experts involved. The present report (version 2.0) supersedes the previous version. However, this will not in any way adversely affect anyone who has already started using version 1.0: this updated version is primarily a supplement and reorganisation, but the essence has remained the same.

Model for the effective professional development of lecturers

The model (Figure 2) distinguishes three domains of building blocks: (1) characteristics of the professional development itself (form/didactics and content), (2) lecturer characteristics, and (3) the characteristics of the institution. The domains in the model have been positioned on the basis of the literature and interviews with experts.

The characteristics of the institution are shown at the bottom of the model because they constitute a prerequisite for effective professional development. They should ideally be in good order to implement professional development effectively or should be developed along the way. This domain corresponds with the sectoral and institutional level of the pyramid model in Figure 1. The lecturer characteristics are shown in the middle of the model because they form both the starting point of the professional development as well as the content and purpose of the professional development. Lecturer professional development has been found to be more effective if the characteristics and needs that lecturers start out with are taken into account, so that provision can be tailor-made. This is why it is important to have an overview of these characteristics right from the outset of the professional development process. At the same time, the aim of professional development is often to develop these same characteristics, which in turn will form the starting point for a subsequent professional development process. As a result, lecturer characteristics actually constitute the hub of the entire professional development process. This is illustrated in the model by an infinity loop. Figure 1 shows the lecturer characteristics at the individual level. The characteristics of the professional development activity itself are placed at the top of the model because professional development must take into account both the lecturer characteristics and the characteristics of the institution. We distinguish between characteristics in terms of content and characteristics in terms of form. This domain corresponds to the institutional level in the pyramid model in Figure 1.

Attempts have been made in the model to avoid an overlap of individual building blocks (and their characteristics), but a certain degree of overlap remains inevitable. This is because the various building blocks are connected and interact with each other. For example, it is important to have a clear overall goal, but also to adapt professional development to the needs of the participants and hence to their individual goals. Building blocks such as subject-specific content and subject-specific didactics will also be difficult to separate in practice.

In the following sections, we will discuss the various domains in Figure 2, starting with the lecturer characteristics. From there, we will then discuss the characteristics of professional development. Finally, we will address the characteristics of the institution that can be regarded as prerequisites for professional development.

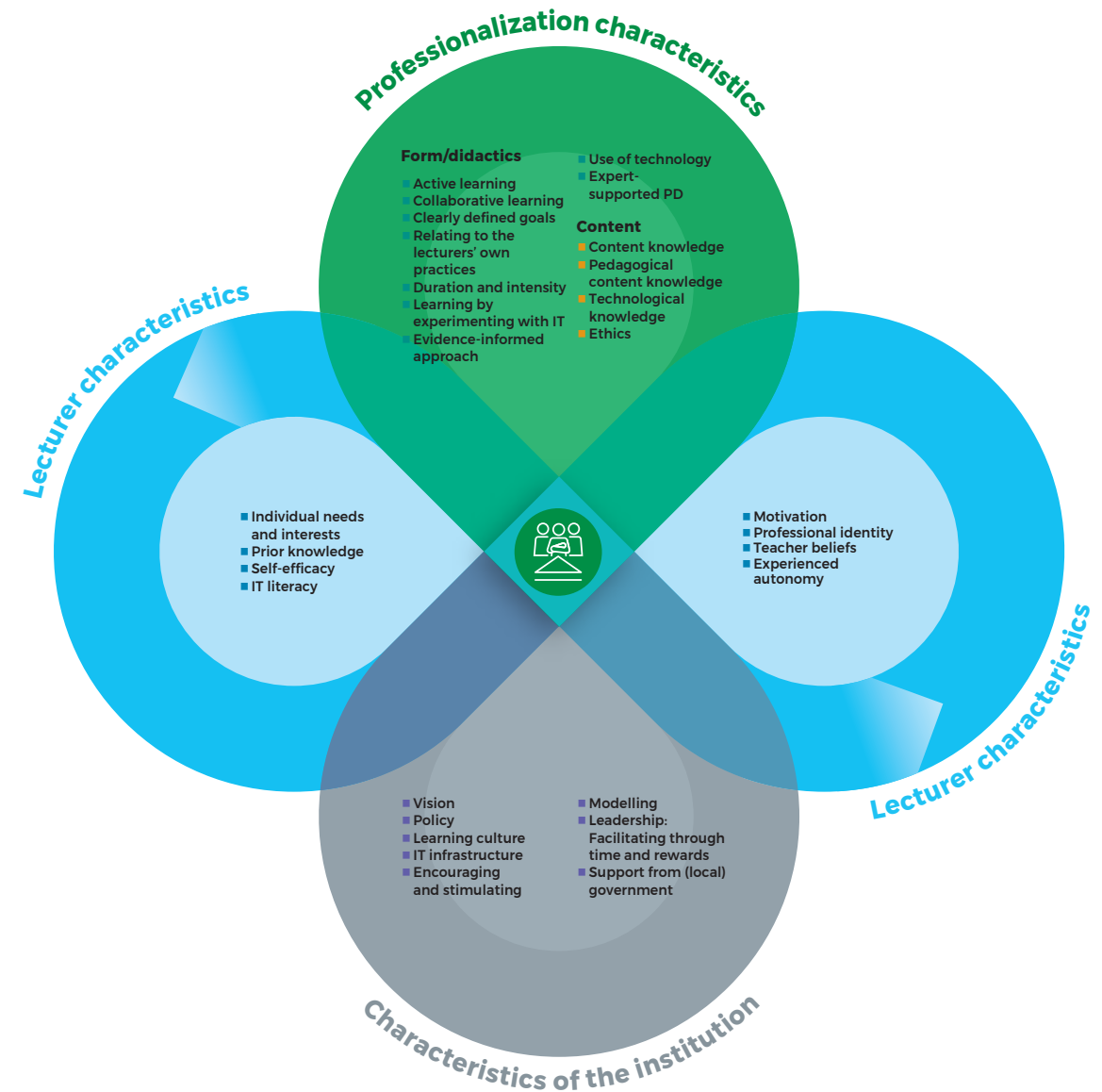
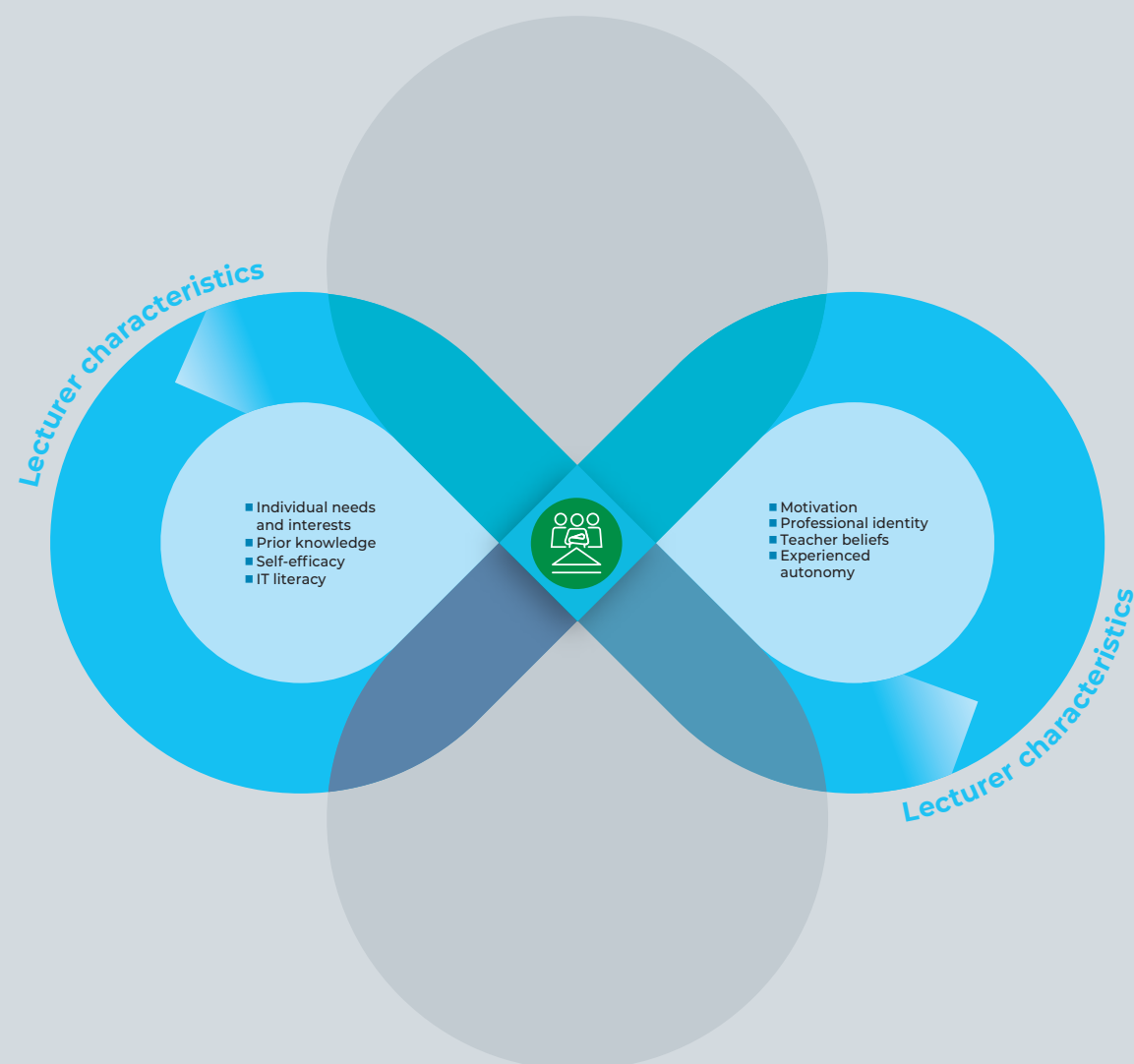

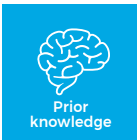



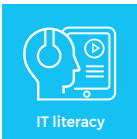

Figure 2. Model including building blocks for the effective professional development of lecturers






Lecturer characteristics

The first domain, the lecturer characteristics, relates to the competencies of lecturers with regard to professional development in educational innovation with IT. It is therefore not about the background characteristics of lecturers (such as age or number of years of work experience), but about what lecturers think, what they know and what they are able to do. It is important to link up with these lecturer characteristics in the professional development process to enable tailor-made provision. At the same time, these same characteristics can also be developed or further developed in the professional development process. Gaining insight into the individual lecturer characteristics can take place both before and during the professional development process. For example, if the provider of the professional development programme notices during the programme that the needs of the participants are not adequately being met, he or she may decide to make certain changes on the spot.

Icon	Name	Definition	Description
	Individual needs and interests	The form and content of the professional development correspond to the personal and individual needs and interests of lecturers with regard to what they want to learn and how they want to learn it.	Professional development programmes have been found to be more effective if they are geared to the characteristics and needs of lecturers. This means tailor-made provision is needed rather than a generic training offering in which lecturers follow a mandatory fixed learning pathway. ^{9,24,25,27}
	Prior knowledge	The knowledge base and competencies that lecturers already have at the beginning of the professional development process with regard to educational innovation with IT.	Professional development must start out from the lecturers' prior knowledge in terms of the content of the professional development activity. The aim of professional development is usually to expand the knowledge and skills of lecturers within a particular theme. However, the knowledge base varies from lecturer to lecturer. It is important to gain insight into where lecturers stand, to activate existing prior knowledge and to build on it.

Icon	Name	Definition	Description
 Self-efficacy	Self-efficacy	The lecturers' belief in their own abilities to implement educational innovation with IT in practice.	Self-efficacy influences the design of professional development activities. For example, when lecturers initially rate their own skills as low, professional development will be cast in a different mould than when lecturers rate their own expertise higher. Lecturers who are aware of their own uncertainties can build up the necessary level of self-efficacy. When lecturers experience a newly acquired skill working well in their own teaching practice, they will be better placed to develop and implement new strategies for learning and teaching with IT. ^{9,22}
 IT literacy	IT literacy	The ability to make informed and reasoned decisions on the use of existing technologies that improve learning and teaching.	IT literacy usually focuses on instrumental skills, information skills, media skills and computational thinking. It is important to take into account the extent to which lecturers can justify from an educational perspective why certain IT would lead to the desired learning outcomes in their specific context. ^{2,30-32}
 Motivation	Motivation	The will to learn and innovate in the educational process using IT. We can distinguish between intrinsic and extrinsic motivation. Intrinsic motivation is about the personal motivation to participate in a professional development process and to want to develop in the field of educational innovation with IT. Extrinsic motivation concerns the externally influenced reasons for lecturers to participate.	Motivation can have a positive impact on the effectiveness of professional development. A lack of motivation, by contrast, can have a negative impact and should therefore be discussed prior to the professional development process. The motivation of lecturers can be encouraged by responding to the demands and needs that lecturers have from their teaching practice, but also by making professional development in this area a part of HR policy in the form of an appraisal mechanism. When professional development is perceived as successful or valuable, lecturers are likely to be more motivated to continue their own development in this area in the future. ^{9,19,20,27,29}

Icon	Name	Definition	Description
 Professional identity	Professional identity	A lecturer's core views on what good teaching entails, such as how a lecturer should behave, what his or her role is and what activities are therefore appropriate.	One of the purposes of lecturer professional development should be to align with and influence prevailing views on what good teaching is in such a way that lecturers will use what they have learned in their own teaching practice. This is particularly important in educational innovation with IT, where a change in working methods is key. Lecturers should regularly reflect critically on their own professional identity. This building block is of specific importance in higher education, as lecturers often combine two different roles (that of researcher and teacher) in this context. ⁹
 Teacher beliefs	Teacher beliefs	Lecturers' beliefs about what constitutes good teaching, how students learn and the role and added value of IT.	It is important to identify and reflect on existing teacher beliefs of lecturers at the start of a professional development process. The professional development activity must be arranged in such a way that lecturers become aware of their own teacher beliefs, reflect critically on them and refocus them where necessary. This is certainly true for educational innovation with IT. ^{12,22}
 Experienced autonomy	Experienced autonomy	The ability and capacity that lecturers experience in the decision-making processes within their department and educational institution (agency).	The autonomy of lecturers must be taken into account, for example by allowing lecturers to determine their own learning objectives. It is also important for lecturers to feel that they are allowed to make decisions regarding educational innovation with IT in their own teaching practice. This involves being aware of your place in the organisation (the system), knowing what you can and cannot influence and how you can bring influence to bear. ^{20,22}

Professionalization characteristics

- Form/didactics**
- Active learning
 - Collaborative learning
 - Clearly defined goals
 - Relating to the lecturers' own practices
 - Duration and intensity
 - Learning by experimenting with IT
 - Evidence-informed approach
- Use of technology**
- Expert-supported PD
- Content**
- Content knowledge
 - Pedagogical content knowledge
 - Technological knowledge
 - Ethics






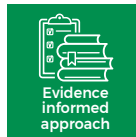
Characteristics of professional development



The second domain, the characteristics of professional development, contains building blocks that are related to the form and didactics used or the content of the professional development activity.

Form/didactics





Icon	Name	Definition	Description
	Active learning	Any learning activity in which lecturers actively participate or in which they are actively involved in the content and form of their own professional development process, rather than passively receiving the learning activities.	Active learning results in deeply embedded, highly contextualised professional learning. Active learning can take many forms, including sharing and discussing experiences, studying and discussing the work of students, seeking underlying meaning in the subject matter and conducting discussions. It is important that lecturers actively participate in their own development, for example by observing experts or being observed by experts, followed by an interactive (peer) feedback and discussion session. A mix of learning and work forms contributes to the offering of tailor-made provision (see also lecturer characteristics). For example, by mixing up formal and informal learning activities. ^{10-12,20,21,23-29,33-36}
	Collaborative learning	Groups of lecturers (and other stakeholders) working together on specific objectives, for example in the form of professional learning communities or networks (such as design teams, data teams and multidisciplinary teams).	During the collaboration, lecturers can share, discuss and evaluate their experiences, success stories and flops. They learn from each other by sharing their best practices and error-based examples. Collaboration can lead to a shared sense of responsibility for professional development, commitment to achieving the shared objectives and, of course, learning. In transformative learning, it is important that teams are composed along multidisciplinary lines (including not just lecturers but also of IT experts, subject-specific experts and content-specific experts), so that participants can learn from each other's perspectives. ^{9,11,12,19,20,22-29,37}

Icon	Name	Definition	Description
	Clearly defined goals	The goals of the professional development activity must be clear, as must the extent to which these goals will improve teaching practice and student learning.	Lecturers need to work towards clearly defined goals since these influence the effectiveness of the PD. Lecturers must play a role in framing the common goals so that they correspond to the individual goals that lecturers have. Lecturers sometimes need support, for example through question articulation, in order to identify and recognise practical questions. It is also important that the goals are aimed at improving teaching practice and student learning, rather than just improving the knowledge and skills of lecturers. ^{9,11,24,26,29}
	Relating to the lecturers' own practices	Linking the content of the professional development activity to the context in which lecturers teach benefits the transfer to practice.	The connection with lecturers' own teaching practice can be expressed in various ways. Firstly, the professional development activity must be based on the questions and experiences that lecturers have based on their own practice. In addition, professional development should make use of relevant examples of effective educational innovation with IT in order to create a clear vision. Professional development must also include authentic learning situations in which lecturers link theory and practice so that it becomes meaningful to them. Applying what you have learned in your teaching practice ensures the transfer of what has been learned. The focus must be on the lecturer's own teaching practice, but this does not mean that professional development always has to take place within the participant's own institution (workplace learning). Workplace learning includes not only learning at work, but also learning for work and from work. There are examples of effective professional development interventions in the workplace, but also outside, for example in teaching labs or other inspiring environments. ^{10,11,14,19,21,23,24,27,38}

Icon	Name	Definition	Description
	Duration and intensity	Effective professional development is long-term and ongoing. It is therefore not limited to a one-off activity for a limited number of hours, but must be viewed from the perspective of the ongoing professional development of lecturers.	The ongoing duration of professional development is important because it gives lecturers ample time to learn, practice, apply what they have learned and reflect on newly learned teaching strategies with IT. In addition, it is important that activities are placed in the context of continuing professional development and lifelong learning. This requires vision and support at the institutional level. It is important to think about the objectives of professional development and how much time it will take to achieve them. ^{10,11,19–21,23–25,27–29}
	Learning by experimenting with IT	The space for lecturers to acquire new IT skills and try out digital tools.	Experimenting with IT benefits the transfer to the lecturer's own practice. To do that safely, you sometimes need the space to try things out. In gamification literature, this is described as the sandbox concept. In the sandbox, players can make mistakes without risk, giving them scope to experiment. ^{12,39–41}
	Evidence-informed approach	An approach in which both practical knowledge and knowledge obtained from research are used to mould a professional development activity.	Effective professional development incorporates a theory of improvement, a well-validated and explicit reasoning as to why the intervention will contribute to the desired learning outcomes of lecturers (theory of change) and students (teaching theory). During professional development, well-reasoned examples can be offered and supplemented on the basis of practical experience. In addition, it is also important for lecturers to evaluate whether and how the desired objective has been achieved during professional development. ^{11,24,25}




Icon	Name	Definition	Description
	Use of technology	Designing professional development for lecturers using IT, with the aim of improving learning.	In the context of 'teach as you preach', it is important that IT is used in a considered way in the professional development process. Lecturers need good examples and role models when it comes to educational innovation with IT. Examples of IT applications include online forums and support, online case discussion videos and the use of video for learning and teaching. These applications can be used, for instance, to actively benefit the learning process or to increase interaction between lecturers. It is valuable to reflect with lecturers on the IT applications used during professional development and the intended objectives. ^{12,22,23,27}
	Expert-supported PD	Professional development is carried out or supported by experts in educational innovation with IT. For example, educational experts acting as coaches or mentors, IT or subject-specific experts or other experts, such as researchers and designers.	Coaches or other experts can act as role models or discussion partners for the lecturers. What's more, they can offer multiple and different perspectives and challenge established practices, which is necessary to achieve the best possible learning process. An effective coach does not impose his or her own working method, but works in a solution-oriented way with the lecturers to help them choose a more strategic approach for their lessons and to critically question existing practices. ^{9,19,20,23,25,28}

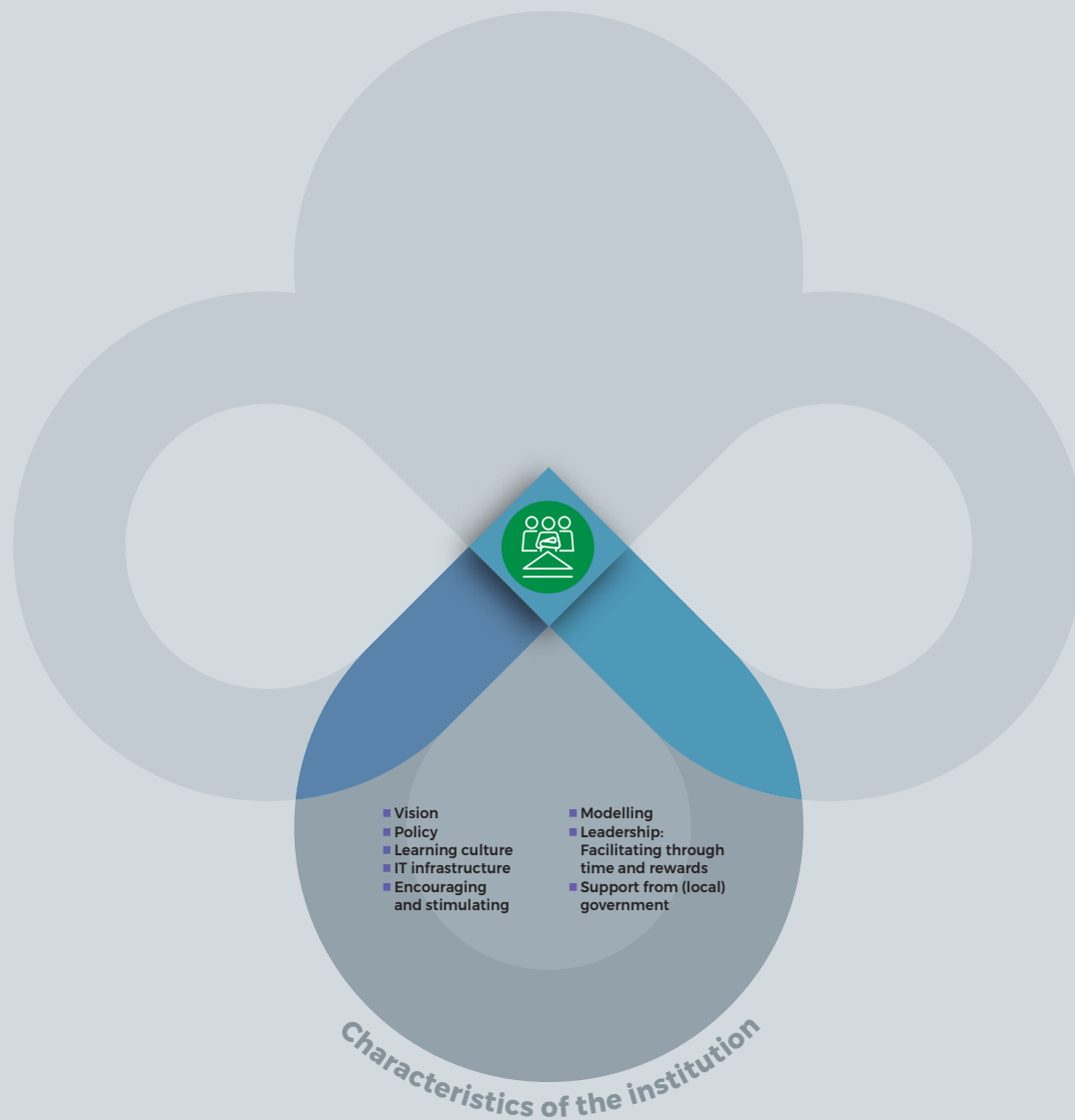
Content

Icon	Name	Definition	Description
	Content knowledge	Knowledge and skills in a specific field, such as facts, concepts, theories and principles.	In professional development, it is important to link the content knowledge to educational innovation with IT and to give lecturers insight into how innovative technology contributes to the development of the content knowledge. Professional development focused on content knowledge alone will probably be less effective. ^{11,19,20,24,25}
	Pedagogical content knowledge	The specific pedagogical knowledge required for the content knowledge being taught by the lecturer. This includes the way in which knowledge is transferred, the learning of skills, understanding the education process, and supporting students in their own development.	Professional development must link pedagogical content knowledge to educational innovation with IT so that lecturers can gain an understanding of how innovative IT can support the transfer and learning of new content knowledge and skills. ^{10,11,20,24-26}
	Technological knowledge	Knowledge of IT and IT innovations and their potential applications in teaching and student learning.	Knowledge of IT innovations is a prerequisite for professional development. It is important that lecturers learn to recognise the opportunities that IT offers their content knowledge and pedagogical content knowledge, and continually seek to substantiate why certain IT in their teaching practice would lead to the desired learning outcomes. These 'reasoning chains' require the lecturer to describe each choice. ^{14,42}
	Ethics	A reflection on the (possible) impact of the use of IT for educational innovation on the values that education seeks to imbue.	The use of IT in education is not value-free and can lead to ethical dilemmas. It is important that lecturers know what ethical questions technology can raise in the education setting. Consider, for instance, the influence that technology has on freedom, privacy, justice, equal opportunities and autonomy. Professional development addresses the ethical questions that technology can raise in education settings. ⁴³


Characteristics of the institution

The third domain, characteristics of the institution, refers to the context in which professional development takes place. This concerns the service and support provided by the educational institution and the national measures that impact educational innovation with IT.

Icon	Name	Definition	Description
 Vision	Vision	A clear vision of the relevance and added value of IT and its contribution to educational innovation.	A vision can form a connecting and inspiring link between different faculties or teams across all levels of an institution. In order to create a shared vision, it is important that the various stakeholders can contribute to its development. Especially within universities, this requires explicit attention because the focus in universities is often on the importance of research. ^{9,15,16,20,24,44}
 Policy	Policy	Translating a vision into policies with clear objectives for the use of educational innovation with IT.	Professional development must be aligned with institutional and national policies and objectives. This will prevent the PD from taking place in isolation and the intended effects disappearing once the intervention is complete. It is important that the professional development policy focuses on both novice and more experienced lecturers. ^{10,17,20,21}
 Learning culture	Learning culture	The professional atmosphere, beliefs, perceptions, responsibilities, relationships and objectives focused on the ongoing development of lecturers.	A learning culture offers space for (critical) reflection, feedback conversations among team members, collaboration, mutual trust as well as time to experiment and share experiences. The presence of this culture will have a positive impact on the extent to which professional development is successful and enduring. ^{11,17,20,22,24}



Icon	Name	Definition	Description
 IT infrastructure	IT infrastructure	The facilities, learning resources and support needed to integrate IT into education and the associated professional development.	A good IT infrastructure is a prerequisite for the integration of IT in learning. This is about the availability, accessibility and quality of the latest software and hardware, including appropriate programs and digital educational resources that support learning and teaching. Furthermore, a good IT infrastructure also includes access to permanent IT and educational support. ^{15,16,20,29,45–48}
 Encouraging and stimulating	Encouraging and stimulating	The extent to which formal and informal leaders encourage and stimulate lecturers to innovate their teaching practice with IT.	Encouraging and stimulating lecturers can come in a variety of forms. Leaders can initiate professional development activities and contribute to their sustainability. They can contribute to the learning culture, give lecturers responsibility and actively involve them in educational innovation with IT. They can also make sure that an institution's educational vision and its day-to-day teaching practices are aligned. ^{9,11,20,22,24,29}
 Modelling	Modelling	The extent to which formal and informal leaders act as role models for educational innovation with IT.	If leaders promote the importance of educational innovation with IT and make the development of their own competencies in this field visible, this will act as a stimulus for the use of IT for educational innovation by lecturers. ^{11,15,25,46,47}
 Leadership: Facilitating through time and rewards	Leadership: Facilitating through time and rewards	The extent to which leaders make sufficient time available in both the timetable and the duties of lecturers, and the extent to which they offer the prospect of a reward, such as a promotion or increased salary.	If lecturers have sufficient time, there will be room for professional development without increasing their workload. The time is needed so that they can participate in (long-term) professional development activities, but also so that they can experiment with what they have learned by implementing it in their own teaching practice. A reward can encourage the participation of lecturers and increase their motivation. ^{9–11,20,25}

Icon	Name	Definition	Description
 Support from (local) government	Support from (local) government	Support from a responsible governmental or regional authority, for example in the form of grants and partnerships.	Professional development activities undertaken at the institutional level are related to the national context. It is important that professional development is supported by the national government. This can be done by creating close cooperation between government authorities and higher education institutions to define national measures relating to educational innovation with IT. In the Netherlands, the government offers lecturers the opportunity to apply for funding for the implementation of innovations in their subject and teaching practice. This shows how national policies can provide a stimulus for educational innovation and reward innovative education. ^{10,20,21,37}

Conclusion

In this report, the Facilitation of lecturer professional development zone described a set of building blocks that higher education institutions can use to design and evaluate the form, content and organisation of effective lecturer professional development aimed at educational innovation using IT. These building blocks and the corresponding model were created following a literature review, discussions with experts and practical experiences.

Although this report provides a clear outline of effective building blocks, the literature unfortunately does not answer questions such as: Which building blocks are now more important than others and in what context? Are there combinations of building blocks that are more effective than others in a certain teaching context or for certain objectives and content knowledge? For example, are there any discernible differences between universities and universities of applied sciences or between the various education sectors when it comes to effective building blocks? In other words: it is up to professional practitioners to examine which building blocks can be regarded as absolute prerequisites and which ones may be optional. In this way, the model as described here can be further refined and substantiated on the basis of knowledge gained from the teaching practice.

The Facilitation of lecturer professional development zone of the Acceleration Plan has developed a toolkit to provide developers of professional development pathways with the tools needed to put these building blocks to use in professional practice¹. The toolkit enables developers to design and evaluate the content and organisation of professional development activities for lecturers in higher education. Interesting questions you will be able to answer with this toolkit include:

- What are the lecturer characteristics that professional development activities must take into account and work to improve?
- Which key characteristics of the organisation can be taken into account and/or which can have an impact on the efficacy of professional development?
- What are the key building blocks with regard to the content knowledge that have to be considered?
- What is the best form of professional development for our target group and context?

The three domains in the model demonstrate that educational innovation with IT requires an integrated approach within the educational institution. Changes in teaching at level

¹ For more information, see www.versnellingsplan.nl/english.

of the lecturer will of course have to be accompanied by corresponding changes in the teaching organisation. It is important that the various stakeholders within the institution are aware of the interdependencies between the three domains in the model. This is also why the Facilitation of lecturer professional development zone has also developed the integrated IT motion sensor¹¹ to initiate a joint discussion on lecturer professional development with IT across various levels within the institution.

The ultimate objective of professional development is to improve teaching and learning in order to provide assurances of a high quality of education for all students. Ongoing professional development and high-quality continuing education are an essential part of this. It is our hope that the building blocks proposed in this report can be used to improve the quality of the much-needed professional development aimed at educational innovation with IT.

¹¹ For more information, see www.versnellingsplan.nl/english/publication/integral-it-motion-sensor/.

References list

1. Kirschner, P. A., Hendriks, M., Paas, F., Wopereis, I., & Cordewener, B. (2004, October). *Determinants for failure and success of innovation projects: The road to sustainable educational innovation*. Paper presented at the AECT Conference, Chicago, IL. Retrieved from eric.ed.gov
2. Rienties, B., Brouwer, N., Carbonell, K. B., Townsend, D., Rozendal, A. P., Van der Loo, J., Dekker, P., & Lygo-Baker, S. (2013). Online training of TPACK skills of higher education scholars: A cross-institutional impact study. *European Journal of Teacher Education*, 36(4), 480-495. doi.org/10.1080/02619768.2013.801073
3. Shen, C., & Ho, J. (2020). Technology-enhanced learning in higher education: A bibliometric analysis with latent semantic approach. *Computers in Human Behavior*, 104, 106-177. doi.org/10.1016/j.chb.2019.106177
4. Kirkup, G. and Kirkwood, A. (2005). Information and communications technologies (ICT) in Higher Education teaching – a tale of gradualism rather than revolution. *Learning, Media and Technology*, 30(2), 185-199. doi:10.1080/17439880500093810
5. Schildkamp, K., Wopereis, I., Kat-De Jong, M., Peet, A. & Hoetjes, I. (2020). Building blocks of instructor professional development for innovative ICT use during a pandemic. *Journal of Professional Capital and Community*, Vol. ahead-of-print No. ahead-of-print. doi.org/10.1108/JPCC-06-2020-0034
6. Association of Universities, Association of Universities of Applied Sciences, & SURF. (2018). *Acceleration plan educational innovation with ICT*. Retrieved from: www.vsnun.nl/files/documents/Acceleration%20plan%20educational%20innovation%20with%20ict.pdf
7. Guskey, T. R. (2002). Professional Development and Teacher Change. *Teachers and Teaching: Theory and Practice*, 8, 381- 391. dx.doi.org/10.1080/135406002100000512
8. Runhaar, P., Bouwmans, M. & Vermeulen, M. (2019). Exploring teachers' career self-management. Considering the roles of organizational career management, occupational self-efficacy, and learning goal orientation. *Human Resource Development International*, 22(4), 364-384.
9. Gast, I., Schildkamp, K., & Van der Veen, J. T. (2017). Team-based professional development interventions in higher education: A systematic review. *Review of Educational Research*, 87(4), 736-767. doi.org/10.3102/0034654317704306
10. Nelissen, T., Jansen, M., & Olvers, D. (2017). *Succesfactoren docentprofessionalisering*. Avans hogeschool. Retrieved from lic.avans.nl/binaries/content/assets/iavans/service/lic/publicaties/literatuurstudie-docentprofessionalisering_def.pdf
11. Van Veen, K., Zwart, R., & Meirink, J. (2011). What makes teacher professional development effective? A literature review. In M. Kooy & K. Van Veen (Eds.). *Teacher learning that matters* (pp. 3-21). New York, NY: Routledge.
12. Kral, M., & Uerz, D. (2019). Wat vraagt leren en lesgeven met en over ICT van leraren? Het wat en hoe van effectieve professionalisering. In M. Kral, A.-M. van Loon, P. Gorissen & D. Uerz (Eds.), *Leidinggeven aan onderwijsinnovatie met ICT. Sturen op beweging* (pp.47-71). Huizen: Pica.
13. Lam, I., & de Jong, R. (2015). *De ICT-bekwaamheid van docenten verbeteren*. Discussion paper with 7 recommendations. Utrecht:

- SURFnet. Retrieved from www.surf.nl/files/2019-02/ict-bekwaamheid-van-docenten-verbeteren.pdf
14. Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2012). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computers & Education*, 59(1), 134–144. doi.org/10.1016/j.compedu.2011.10.009
 15. Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. *International Journal of Instruction*, 2(1), 77–104. Retrieved from files.eric.ed.gov/fulltext/ED524156.pdf
 16. Law, N., & Chow, A. (2008). Teacher characteristics, contextual factors, and how these affect the pedagogical use of ICT. In N. Law, W. J. Pelgrum, & T. Plomp (Eds.), *Pedagogy and ICT use. CERC Studies in comparative education, vol. 23* (pp. 181–219). Dordrecht: Springer. doi.org/10.1007/978-1-4020-8928-2_6
 17. Losada, D., Karrera, I., & de Aberasturi, E. J. (2012). Factors facilitating successful educational innovation with ICT in schools. *Revista de Psicodidáctica*, 17(1), 113–134. Retrieved from www.redalyc.org/pdf/175/17523162010.pdf
 18. Horvers, A., Uerz, D., Hopster-den Otter, D., & ter Beek, M. (2020). *Literatuurreview Kenmerken van effectieve professionalisering voor docenten in het hoger onderwijs gericht op onderwijsinnovatie met ict* [Literature review characteristics of effective professional development for teachers in higher education aimed at educational innovation with ICT]. Utrecht, the Netherlands: SURF Versnellingsplan.
 19. Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research*, 86(4), 945–980. doi.org/10.3102/0034654315626800
 20. Postholm, M. B. (2012). Teachers' professional development: a theoretical review. *Educational Research*, 54(4), 405–429. doi.org/10.1080/00131881.2012.734725
 21. Van Driel, J. H., Meirink, J. A., Van Veen, K., & Zwart, R. C. (2012). Current trends and missing links in studies on teacher professional development in science education: A review of design features and quality of research. *Studies in Science Education*, 48(2), 129–160. doi.org/10.1080/03057267.2012.738020
 22. Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and Teacher Education*, 27(1), 10–20. doi.org/10.1016/j.tate.2010.08.007
 23. Borko, H., Jacobs, J., & Koellner, K. (2010). Contemporary approaches to teacher professional development. In P. Peterson, E. Baker, & B. McGaw (Eds.), *International encyclopedia of education* (vol. 7, pp. 548–556). Oxford: Elsevier.
 24. Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L., & Coe, R. (2015). *Developing great teaching: lessons from the international reviews into effective professional development*. London: Teacher Development Trust.
 25. Darling-Hammond, L., Hylar, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.
 26. Dogan, S., Pringle, R., & Mesa, J. (2016) The impacts of professional learning communities on science teachers' knowledge, practice and student learning: a review. *Professional Development in Education*, 42(4), 569–588. doi.org/10.1080/19415257.2015.1065899
 27. Elliott, J. C. (2017). The evolution from traditional to online professional development: A review. *Journal of Digital Learning in Teacher Education*, 3(3), 114–125. doi.org/10.1080/21532974.2017.1305304
 28. Gerard, L. F., Varma, K., Corliss, S. B., & Linn, M. C. (2011). Professional development for technology-enhanced inquiry science. *Review of Educational Research*, 81(3), 408–448. doi.org/10.3102/0034654311415121
 29. Hubers, M. D., Endedijk, M. D., & Van Veen, K. (2020). Effective characteristics of professional development programs for science and technology education. *Professional Development in Education*, 1–20. doi.org/10.1080/19415257.2020.1752289
 30. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teacher College Record*, 108, 1017–1054. www.tcrecord.org
 31. Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment & Evaluation in Higher Education*, 43(8), 1315–1325. doi:10.1080/02602938.2018.1463354
 32. Heitink, M., Voogt, J., Verplanken, L., van Braak, J., & Fisser, P. (2016). Teachers' professional reasoning about their pedagogical use of technology. *Computers & Education*, 101, 70–83. doi.org/10.1016/j.compedu.2016.05.009
 33. Girvan, C., Conneely, C., & Tangney, B. (2016). Extending experiential learning in teacher professional development. *Teaching and Teacher Education*, 58, 129–139. doi.org/10.1016/j.tate.2016.04.009
 34. Steinert, Y., Mann, K., Anderson, B., Barnett, B. M., Centeno, A., Naismith, L., ... & Dolmans, D. (2016). A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME guide no. 40. *Medical Teacher*, 38(8), 769–786. doi.org/10.1080/0142159X.2016.1181851
 35. Steinert, Y. (2010). Faculty development: From workshops to communities of practice. *Medical Teacher*, 32(5), 425–428. doi.org/10.3109/01421591003677897
 36. Phuong, T. T., Cole, S. C., & Zaretsky, J. (2018). A systematic literature review of faculty development for teacher educators. *Higher Education Research and Development*, 37(2), 373–389. doi:10.1080/07294360.2017.1351423
 37. McIntyre-Bhatty, T., & Bunescu, L. (2019). Continuous development of teaching competences. Thematic peer group report. Brussels, Belgium: European University Association. Retrieved from hdl.voced.edu.au/10707/528078
 38. Swanwick, T. (2008). See one, do one, then what? Faculty development in postgraduate medical education. *Postgraduate Medical Journal*, 84(993), 339–343. doi.org/10.1136/pgmj.2008.068288
 39. Wiggins, B. E. (2016). An overview and study on the use of games, simulations, and gamification in higher education. *International Journal of Game-Based Learning*, 6(1), 18–29. doi:10.4018/IJGBL.2016010102
 40. Gallego-Durán, F. J., Villagrà-Arnedo, C. J., Satorre-Cuerda, R., Compañ-Rosique, P., Molina-Carmona, R., & Llorens-Largo, F. (2019). A guide for game-design-based gamification. *Informatics*, 6(4), 49. doi:10.3390/informatics6040049
 41. Ostapenko, I. V., & Sosnyuk, O. P. (2016). Gamification as an element of active learning in higher education. *DisCo: Towards Open Education and Information Society*, 1(11), 72–77. Retrieved from lib.iitta.gov.ua/707147/1/Disco2016-sbornik-72-77.pdf
 42. Koehler, M. J. & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70.

43. Pijpers, R., Bomas, E., Dondorp, L., & Ligthart, J. (2020). *Waarden wegen: Een ethisch perspectief op digitalisering in het onderwijs*. Zoetermeer, The Netherlands: Kennisnet.
44. Van Rhijn, S. (2018). De implementatie van Blended Learning in het medisch onderwijs: Een multiple case-studie naar de factoren die de implementatie van Blended Learning op curriculumniveau beïnvloeden. Master's thesis, University of Amsterdam.
45. Lam, I. & de Jong, R. (2015). Van docent-professionalisering naar onderwijsontwikkeling. Inventarisatie van de status quo van ICT-docentprofessionalisering. Utrecht: SURF. Retrieved from www.surf.nl/files/2019-02/rapport-inventarisatie-ict-docentprofessionalisering.pdf
46. Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology for Teacher Education*, 9(3), 319–342. Doi:10.1080/14759390000200096
47. Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using Information and Communication Technology*, 8(1), 136–155. Retrieved from files.eric.ed.gov/fulltext/EJ1084227.pdf
48. Tondeur, J., van Keer, H., van Braak, J. & Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy. *Computers & Education*, 51(1), 212–223. doi.org/10.1016/j.compedu.2007.05.003

Experts consulted:

- **Prof. Dr. Ruben Vanderlinde** is Associate Professor of Educational Studies at Ghent University.
- **Prof. Dr. Jan Vermunt** is Full Professor of Learning and Educational Innovation at Eindhoven University of Technology.
- **Dr. Kim Schildkamp** is Associate Professor at the Faculty of Behavioural Sciences of the University of Twente
- **Prof. Dr. Joke Voogt** is Full Professor at the University of Amsterdam & Windesheim University of Applied Sciences
- **Dr. Marijke Kral** is Lector of Learning with ICT at HAN University of Applied Sciences
- **Dr. Anne-Marieke van Loon** is Associate Lector of Learning with ICT at HAN University of Applied Sciences.

Appendix

The set of building blocks





The Acceleration Plan for Educational Innovation with ICT is a four-year programme focused on bringing initiatives, knowledge, and experiences for digitalisation together. The programme is an initiative of SURF, the Netherlands Association of Universities of Applied Sciences, and the Association of Universities, and is organised in eight acceleration zones. In the Facilitation of lecturer professional development zone, 18 institutions are working on improving the professional development of lecturers in Dutch higher education.



For more information and our publications, visit
www.versnellingsplan.nl/english