

Holistic design of online degree programmes in higher education – a case study from Finland

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Received 30 December 2020
Revised 24 July 2021
Accepted 14 October 2021

Abstract

Purpose – The purpose of this paper is to present design principles for holistic design of online degree programmes (ODPs) in higher education (HE). The study adds to previous research on online programme design by examining how the digital competence and pedagogical strategy of a HE organisation can inform holistic ODP design.

Design/methodology/approach – This paper presents a case study placed in the context of a Finnish applied HE organisation. Design-based research (DBR) process is used to create holistic design principles for new ODPs. Theoretical framework for the study is digitally competent organisation (Kampylis *et al.*, 2015) and pedagogical strategy is innovation pedagogy (Kettunen *et al.*, 2013).

Findings – Design principles for pedagogically informed holistic design of ODPs are presented as a three-tiered model comprising organisational, pedagogical and ODP layers. Each layer includes various principles for holistic design to integrate an organisation's pedagogical strategy in a digitally competent context to create quality ODPs.

Research limitations/implications – The paper presents a case study from a HE organisation in Finland, but results are applicable to a wider global audience.

Practical implications – As a contribution to practitioners, this paper presents a three-tiered holistic design of ODP in HE organisation, where the design principles are categorised in organisational, pedagogical and ODP design layers. In addition, suggestions to managers, instructional designers and educators are made for the holistic design of ODPs.

Social implications – Building the sense of community in ODPs and offering continuous support in pedagogy and technology are valuable for the well-being of the staff, students and the wider society.

Originality/value – The paper draws relationships between holistic design of ODPs, digital competence and pedagogical strategy. The paper provides managerial and operational viewpoints to managers, administrators and educators of HE organisations that plan to create new ODPs with a holistic focus on the educational organisation, its pedagogical strategy and digital competence. Recommendations for further development, possible applications and research of ODP education are made.

Keywords Online degree programme, Holistic design, Pedagogical strategy, Higher education organisation

Paper type Case study

1. Introduction

The purpose of this paper is to identify design principles for organisational holistic design of online degree programmes (ODPs). As more higher education (HE) organisations are offering

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The author extends deepest gratitude to the managers and staff members of Turku University of Applied Sciences for supporting the research process and sharing their expertise to create new online degree programmes in the organisation. The author acknowledges the valuable support received from the national eAMK project managers and staff members to research the design of online degree programmes in the national context. In addition, the author expresses sincere thanks to the staff members at University of Lapland for guidance in the design-based research process.



degree education online, most recently due to the COVID-19 pandemic, there is a greater need to understand how an educational organisation can take into consideration the organisational pedagogical approaches and digital competence required for a quality ODP, as effective programme design processes are needed for sustainable online programmes (Chipere, 2017).

Previous research has focused largely on the design of online courses rather than on the holistic design of online programmes (Kumar, 2014). This case study adds to previous research by approaching the design process from an organisational holistic viewpoint and drawing relationships between elements of ODP design, pedagogical strategy and digital competence of an educational organisation. Integration of management, teaching and technical team is needed to ensure quality in online programme delivery (Combe, 2005), and expert consultations from stakeholders within the organisation are used in this case study to integrate each team in the design process.

Organisations need to consider what type of online education fits their purposes, as one size does not fit all (Naidu, 2017). This paper reports on the first cycle of design-based research (DBR) (Collins *et al.*, 2004) process in the context of a practical-oriented HE institution in Finland where the need for the holistic design arose when the organisation decided to start offering fully online bachelor-level degree programmes in autumn 2017.

Pedagogy has been identified as one of the key factors for successful online programmes (Rovai and Downey, 2010). The Finnish applied HE organisation presented in this study follows a specific pedagogical strategy called innovation pedagogy (Kettunen *et al.*, 2013; Konst and Kairisto-Mertanen, 2020), which created the need to integrate the pedagogical strategy in a holistic design.

According to innovation pedagogy, learning cannot be separated from the surrounding environment (Kettunen *et al.*, 2013). Innovation pedagogy focuses on those teaching and learning methods that enable the learner to collaborate and construct knowledge through social interaction and dialogue (Penttilä *et al.*, 2013) and develop specific study programmes and innovation competences that are gained during the learning process (Keinänen and Kairisto-Mertanen, 2019).

The holistic design integrates the organisation's digital needs to the needs of the pedagogical strategy. The theoretical framework used in the study is digitally competent organisation (Kampylis *et al.*, 2015), as it can be used a strategic tool for using digital learning technologies in educational organisations for a process of planning for change on three dimensions: pedagogical, technological and organisational (European Commission, 2018). Digitally competent organisation (DigCompOrg) offers a conceptual framework for educational organisations that wish to implement digital solutions in their teaching, learning, assessment and related learning support activities (Kampylis *et al.*, 2015).

The following sections present the theoretical background, materials and methods and results. As a practical contribution to practitioners, this paper presents a three-tiered holistic design of ODPs in HE organisations, where the design principles are categorised into organisational, pedagogical and ODP design layers. In addition, suggestions to managers, instructional designers and educators are made for the holistic design of ODPs. The paper concludes by discussing possible applications of the design as well as possibilities for further research.

1.1 Online degree programmes in the national context

Fully ODPs are still relatively uncommon in Finnish HE context, in comparison to blended programmes offered by most higher education institutions (HEI), and thus relevant research is still limited. In fact, a national ODP working group found that the terms 'multimodal degree programme' and 'online degree programme' are often used as almost interchangeable alternatives in Finnish applied HE organisations; thus, national recommendations for the definitions of multimodal and ODPs were created (Joshi *et al.*, 2018).

In this paper, an ODP refers to a degree programme that is completed online; has interactive elements, synchronous online meetings and guided study (Joshi *et al.*, 2018); and where students have online access to all services and support provided by the education organisation (Sener, 2002, 2015). An applied HE organisation in this study refers to HE-level educational institution where students can obtain university-level degrees in applied sciences.

A search conducted in autumn 2016, using a search term *verkkotutkinto (online degree)*, on a website (Studyinfo.fi) that offers information about study programmes leading to a degree, revealed there were eight online bachelor-level HE degree programmes in Finland to which students could apply through the general application system. Interestingly, only one ODP was offered in English. It is also worth noting that all ODPs listed on the website at the time were offered by universities of applied sciences, not by science universities (Joshi, 2017).

Future visions for ODPs in Finland show various possibilities for new types of fully online degree education provided in national collaboration (Joshi *et al.*, 2020), thus resulting in a need for further research in ODP design.

1.2 Online degree programmes in the organisational context

In 2016, a strategic decision was made by the management of the Finnish applied HE organisation presented in this paper to create the first three bachelor-level ODPs. The aim was to respond to the needs of the future by transforming education and contributing to the societal change caused by globalisation and digitalisation, as there is a growing need for creating flexible lifelong learning opportunities (Konst and Scheinin, 2018) and meeting future students' expectations (Marquez-Ramos and Mourelle, 2018). University management led the change in education by encouraging their faculty to implement new ways of delivering education (Keinänen and Kairisto-Mertanen, 2019).

As the organisation had no background in offering fully online degree education, there was a need to find possible models for the design. Moreover, as the organisation follows an organisation-wide pedagogical strategy, there was a need to integrate the practically focused pedagogy throughout the design. Digital competence of the educational organisation was an important consideration for the design principles as there was a need to understand the organisation-wide requirements set by the fully online context for offering quality degree education.

The applied HE organisation currently offers bachelor- and master-level education in various vocational fields, including business, technology, health and arts. The first bachelor-level ODPs were designed for three different study fields: international business, social services and media production. Although differences in disciplines exist, an organisational holistic approach with centralised internal development focus was important for the overall design.

1.3 Strategic approaches to online degree programme design

Strategic design (Stevens, 2010) refers to the use of design services that an organisation can use to gain competitive advantage, and strategic planning is the first factor in achieving success with online education (Rovai and Downey, 2010). Moreover, strategic organisational change should be supported by all stakeholders and embraced as part of the organisational culture (Rovai and Downey, 2010). However, only few organisations seem to have a strategy for offering online education (Obexer, 2018).

The definition of strategy by Porter (1996) can be applied in the organisational approach to the design of ODPs as 'the creation of a unique and valuable position, involving a different set of activities', where the responsibility of the strategic development is on the organisation. Pedagogical strategy is an element of the organisation that influences all operations, including learning and teaching, working life cooperation and curriculum design (Konst and Kairisto-Mertanen, 2020).

Lockhart and Lacy (2002) list the institution's readiness for online education as the first criteria in assessing the quality of online programmes. Moore and Kearsley (2005) suggest

strategic planning for managers of online programs to include various processes, such as vision, mission and objectives; available resources; trends; emerging technological options; and financial needs.

Paolucci and Gambescia (2007) identified different administrative structures for ODPs and concluded that most were following internal structuring with academic departments in charge. Jefferies *et al.* (2007) investigated ethical considerations in the development of e-learning strategy, pedagogy and technology and found that if a chosen technology does not support the pedagogical choices, or if the chosen pedagogical approach creates ethical conflicts, then the technology may not fulfil its purpose of being used for education.

Bailey *et al.* (2018) found that one factor preventing successful implementation of online learning is inconsistent support from leadership, as well as lack of proper measurement, which, in turn, prevents further improvement in quality. A strategic organisational approach in the design is important in creating quality ODPs.

1.4 Holistic approach to online degree programme design

The holistic design of ODPs refers to the inclusion of various aspects of the organisation, including strategic decisions, infrastructure, student support, curricula and teacher training. In this study, the pedagogical strategy and digital competence of the organisation add layers to the holistic design.

Combe (2005) found the most important quality factor in the design and implementation of an online doctoral programme to be globally recognised qualification, supported by content, assessment and delivery that enhance professional skills and career opportunities. Benson (2003) highlighted the importance of defining the quality criteria in the context of the ODP level in question.

Suhonen and Sutinen (2014) used a four-pillar model to investigate the success of online doctoral programme and found that environmental sustainability, which includes the programme's physical, technical, cultural and social context, requires for the programme to be integrated with the educational ecosystem of the organisation and the student. Waugh and Su (2015) found it may not be possible to design an online programme that fits everyone's needs but instead identify the type of students and a programme that fits them. Hermansen (2020) suggests that programme design cannot be separated from surrounding organisational, epistemic and political practices.

HE should provide equal and inclusive high-quality education for all students. According to Artiles *et al.* (2006), inclusive education is theorised broadly as an agenda that enriches learning from multiple perspectives, including cultures, experiences and ability for all students. European Union's (2020) Digital Education Action Plan proposes that digital technology can support the provision of inclusive high-quality education when used appropriately by skilled and trained staff. Moriña (2017) suggests faculty be trained in inclusive pedagogy and universal designs for learning to ensure inclusive HE. However, Walton and Rusznyak (2017) conclude that teacher education alone is not enough to ensure design of inclusive education.

A study by Bodhi *et al.* (2021) supports previous research that shows the importance of university environment and teachers' attitudes to inclusive education but found that also spirituality was an important factor. They suggest organisations communicate their behavioural patterns and indicate they are part of the larger society (Bodhi *et al.*, 2021). A holistic perspective in the alignment of programme design to wider institutional practices is needed to achieve quality outcomes of ODPs as an integral part of the surrounding society.

1.5 Pedagogy in online degree programme design

The holistic design includes the pedagogical strategy of the organisation. Pedagogical design in this paper is interpreted as a wider concept than instructional design, similar to Häkkinen and Hämäläinen (2011).

Rovai and Downey (2010) emphasise the importance of course design and pedagogy but highlight the often conflicting status of making money and academic quality. It is important to develop pedagogical approaches to online degrees in HE (Green *et al.*, 2010; Jääskelä and Nissilä, 2015) for them to gain the same value and status (Adams and de Fleur, 2006) as traditional degrees. Pedagogical strategy can be used as a differentiating factor in creating sustainable ODPs, and Rovai and Downey (2010) highlight the importance of marketing efforts in differentiating online education offered by the organisation.

Carraher Wolverton and Guidry Hollier (2019) suggest that there are disciplinary differences in instructional design and content consumption of online learning which are important to consider in the design process. However, this study focuses on organisation-level approach to pedagogy applied to all disciplines across the organisation; thus, specific needs of different disciplines or cohorts are not considered.

Yang *et al.* (2017) found that fully online programme attributes that positively affect students' persistence in completing their online programmes are relevant to individual/professional needs and satisfaction with course, programme and learning outcomes. Creating support networks between students and staff is also important (Yang *et al.*, 2017). Scarabottolo (2019) found that online degree students seem to have higher commitment to study and they performed better in exams than classroom students, which they owed to design of learning.

In this study, innovation pedagogy is used as the pedagogical strategy of the organisation. It focuses on creating networks, flexible study paths and autonomy of learners through innovation competences that develop on both individual courses and throughout the entire degree (Keinänen and Kairisto-Mertanen, 2019). It comprises nine cornerstones: working-life orientation and cooperation; entrepreneurship; globalisation; systemic thinking; RDI operations; flexible curricula; multidisciplinary; activating learning and teaching methods; development-oriented assessment; and renewing teacher and student roles (Konst and Kairisto-Mertanen, 2020).

One or more of these cornerstones should be integrated into any teaching and learning activity (Penttilä *et al.*, 2013), all of which aim to create satisfaction with learning by creating a good (working) life for students and supporting in creating a sustainable future (Konst and Kairisto-Mertanen, 2020). Thus, it is important to design ODPs that meet the needs of the pedagogical approaches set by the organisation.

1.6 Digital competence of an educational organisation

Organisations implementing degree education in online environments should be digitally competent to provide degree education in a fully online context.

The design of ODPs can benefit from the research done in the field of distance education, as methods of distance instruction and learning can be relevant to fully online education, where, for example, the target group, infrastructure or delivery modes can be similar, as identified by Sener (2002). Saba (2016) suggests that HE institutions can use technology by designing curricula and programmes that utilise theories of distance education and provide learners with flexible choices, autonomy and structure in a supportive community of instructors and peers. Learning can extend beyond the ODP and the organisation, thus creating an online community or even a digital learning ecosystem (Pöldoja, 2016).

In this study, DigCompOrg (Kampylis *et al.*, 2015) is used as a framework for the design of ODPs in HE where organisations' support services for students are offered online. Moore *et al.* (2011) found that it is important to describe the instructional characteristics of the learning environments to ensure shared understanding, which is important in holistic approach when creating design principles for organisation-wide ODP design.

As the framework requires one to provide a certain level of quality in the seven thematic elements (leadership and governance; teaching and learning; professional development; assessment; content and curricula; collaboration and networking; and infrastructure) and their sub-elements, it can ensure a quality viewpoint in the design process. Moreover, previous research on DigCompOrg related to digitally competent educational organisations is mostly in basic education, and thus this paper can add value on the level of HE.

2. Materials and methods

The methodological approach used is DBR, where the researcher is an active part of the research process (Design-Based Research Collective, 2003). The DBR process was completed during one academic year, from autumn 2016 until end of spring 2017, and covers the initial stages of designing the ODPs before the actual starting point of the programmes. Therefore, this paper does not present the actual experiences of using the design principles in the implemented ODPs; instead, it focuses on the process of creating the design principles.

DBR process addresses theoretical questions in real-life contexts (Collins *et al.*, 2004) and involves the continuous cycles of design, enactment, analysis and redesign intertwined with design of learning environments and developing theories, in order to create theories for sharing with research community that have been tested in authentic context and lead to outcomes (Design-Based Research Collective, 2003). The initial design was created for the purposes of starting the first three bachelor-level ODPs in three faculties of the organisation. The DBR process consisted of three parts, each of which added a layer to the design.

In DigCompOrg (Kampylis *et al.*, 2015), the connection between individual and organisational responsibilities focuses on shared responsibility between the governance and stakeholders working together (European Commission, 2018). Different expertise and roles are required in the development of online initiatives, as pointed out by Durdu *et al.* (2009). In this study, the stakeholder views were gained from expert consultations within the organisation. Another purpose of the expert consultations was to integrate the pedagogical strategy of the organisation in all aspects of ODP design. The review of background literature gave an understanding of features for quality in ODP design.

Table 1 summarises the DBR cycle 1 process, followed by detailed descriptions.

2.1 Online degree programme design

In the first part of the design, a thematic literature search was conducted to find various principles, models and guides for designing ODPs. The main aim was to understand what

DBR process	Description
1. Online degree programme design	<ul style="list-style-type: none"> • Method: Thematic literature review of online degree programme design principles and models • Aim: To understand design principles for online degree programme design with focus on organisation, quality and pedagogy
2. Pedagogically informed design	<ul style="list-style-type: none"> • Method: Integration of pedagogical strategy of the organisation to digital competence and online degree programme design • Aim: To apply principles of pedagogical strategy in the online degree programme design
3. Organisational design	<ul style="list-style-type: none"> • Method: Expert consultations within the organisation • Aim: To ensure implementation of pedagogical strategy and digital competence in organisational online degree programme context

Table 1.
Research design

	Stakeholders	Participants	Aim of expert consultation	DigCompOrg thematic elements (Kampylis <i>et al.</i> , 2015, p. 18, Table 4)
1	Degree programme (size varied according to faculty size, e.g. international business, $n = 12$)	Degree programme staff, including head of education and research, degree programme coordinator, teacher tutors, teachers, student assistant	The design of the online degree in terms of the needs of the faculty, study field and working life	Leadership and governance practices; content and curricula; collaboration and networking; teaching and learning practices; assessment practices; professional development; digital infrastructure; sector-specific element(s)
2	Online degree programme ($n = 6$, also part of above degree programme)	Coordinator of each online degree programme ($n = 3$); heads of each degree programme ($n = 3$)	Consistency in the design of the online degree in terms of quality in planning, implementation and support mechanisms	Collaboration and networking; teaching and learning practices; assessment practices; content and curricula; digital infrastructure
3	Digital education and technical support ($n = 7$)	Head of learning environment services, IT experts, virtual learning environment experts, educational technology experts	Availability of necessary technical infrastructure, equipment, programmes, applications and training	Digital infrastructure; professional development; teaching and learning practices; assessment practices; content and curricula
4	Support services ($n = 5$)	Student office, library services, health services, study counselling and psychologist, student union	Availability of support services in online environments	Collaboration and networking; digital infrastructure; leadership and governance practices
5	Pedagogical services ($n = 6$)	Head of future learning design and innovation pedagogy, head of higher education research group, trainers and experts of online pedagogy	Integration and training of innovation pedagogy in curriculum design, teaching and learning methods and environments	Teaching and learning practices; assessment practices; professional development; leadership and governance practices; content and curricula; digital infrastructure
6	Degree programme students ($n = 6$)	Students of marketing and business operations (bachelor of business administration, international business online)	Creation of marketing materials relevant for target group and suitable for online degrees	Collaboration and networking; teaching and learning practices; content and curricula

Table 2.
Expert consultations in the design process

quality factors are important when creating new ODPs in HE organisations where the entire organisation follows one pedagogical strategy.

The search was conducted during 2016 using the search service Nelli (National Electronic Library Interface) provided by the HE organisation; however, at the time of the study period, Nelli transitioned to a new wider system Finna, a collection of search services that provide

access to organisation-specific materials (Finna, n.d.). The search was limited to HE, and keywords used were *online degree programme*, *virtual degree*, *digital degree*, *higher education*, *design*, *model* and *quality*.

In the search, the terms virtual, digital and online were all used, as during the initial development stages of the ODPs, they were referred to as virtual degrees in the local context. Moore *et al.* (2011) describe the variance in the use of terms related to online learning environments and conclude that there is lack of consistency. Johnston (2020) lists online learning as one variation of the term distance education and suggests today's distance learning experience is not fully reflected by current terms.

The results of the search revealed several studies that reported on the experiences of implemented online programmes, comparisons to onsite programmes in various study fields or focused on administrative or strategic development of online degrees. Some frameworks discussed developing undergraduate online degrees (e.g. Newlin and Wang, 2002; Snell and Penn, 2005) or doctoral degrees (e.g. Combe, 2005), especially in the field of applied sciences (e.g. Kessler and Haggerty, 2010), how it should be approached from a pedagogical point of view (e.g. Hochberg, 2006) and how teachers' viewpoints should be taken into account in the development process (e.g. Baran *et al.*, 2011).

Some models were available for strategic development (e.g. Jefferies *et al.*, 2007) of online degrees and approached the topic from an administrative (e.g. Howell *et al.*, 2003; Paolucci and Gambescia, 2007) or quality (e.g. Lockhart and Lacy, 2002; Benson, 2003; Rovai and Downey, 2010; Swan *et al.*, 2014) point of view. Literature also revealed it is important to develop pedagogical approaches to online degrees in HE (e.g. Green *et al.*, 2010; Kumar, 2014) in order for them to gain the same value and status (e.g. Adams and de Fleur, 2006) as traditional degrees and offer the same quality in an entirely online degree as onsite.

Only those studies that focused on design of quality principles of ODPs were selected for further consideration in the pedagogical team of the HE organisation, from which relevant principles and theoretical contributions to ODP design were selected. The results are presented in Table 3 of this paper.

For the HE organisation, it was important to approach the design from the perspective of having all support services available fully online after the launch of the programmes. However, as the organisation had no previous experience of offering fully ODPs, a framework that would allow the integration of the organisation's unique pedagogical approach was needed. DigCompOrg (Kampylis *et al.*, 2015) was selected as a theoretical framework for the organisational design process, as it approaches the use of digital learning technologies in educational organisations from pedagogical, technological and organisational aspects. Each of the seven main thematic elements and 15 subelements of DigCompOrg were examined in the ODP design; results are presented in Table 3 of this paper.

2.2 Pedagogical design

In the pedagogical design part, the design was informed by the pedagogical strategy of the organisation. The main aim was to investigate how the pedagogical strategy could be integrated holistically in all aspects of the ODP design. The pedagogical strategy applied in the design is innovation pedagogy. It is a pedagogical approach that arises from humanism, cognitivism, sociocultural approaches and collaborative learning (Penttilä *et al.*, 2013) to construct knowledge that can create innovation for the needs of working life.

Innovation pedagogy supports the development of innovation competences through five dimensions: creativity, critical thinking, initiative, team working and networking (Konst and Kairisto-Mertanen, 2020), identified as top skills desired by employers in the future (World Economic Forum, 2020). Keinänen and Kairisto-Mertanen (2019) found that students who have more experience of studying in different learning environments of innovation pedagogy

Research design layer 1 Online degree programme design	Research design layer 2 Pedagogical design (innovation pedagogy, Kettunen et al., 2013)	Research design layer 3 organisational design (Elements of DigCompOrg Kampylis et al. (2015))	Key elements for holistic design principles
Strategic need and planning for online programme (Rovai and Downey, 2010)	Innopeda as a pedagogical strategy	Leadership and governance practices	Strategic approaches
Quality of online degree programme (Benson, 2003)	Innopeda as a pedagogical strategy	Leadership and governance practices	Quality assessment
Creating a new curriculum for online degree education (Durdu et al., 2009)	Innopeda curriculum	Content and curricula; teaching and learning practices; assessment practices	Pedagogy and technology in curriculum design
Ensuring competence of teaching staff (Rovai and Downey, 2010)	Renewing teacher roles	Professional development	Professional training of pedagogy and technology
Collaborating for continuous development of programme and learning (Swan et al., 2014)	Innovation competences	Collaboration and networking	Collaboration and networking
Reaching potential target market of online degree programme (Rovai and Downey, 2010)	Innopeda as a pedagogical strategy; innovation process in learning	Leadership and governance practices	Marketing of pedagogy and online context
Creating quality in online teaching (Benson, 2003)	Activating teaching and learning methods; versatile and development-oriented assessment	Teaching and learning practices; assessment practices	Quality education, teaching and learning
Creating services and tools to support students and staff (Moore et al., 2011)	Multidisciplinary learning environments	Digital infrastructure	Creating environments and using technology
Offering support services online (Lockhart and Lacy, 2002)	Innovation process in learning; innovation competences; better life	Teaching and learning practices; digital infrastructure	Supporting staff and students in pedagogy and technology
Inclusion of online staff and students into community of practice (Swan et al., 2014)	Better life	Collaboration and networking	Well-being and collaboration of online community

Table 3.
Three layers of holistic
design of online degree
programmes in the HE
organisation

seem to evaluate their innovation competences higher, thus possibly being able to better transfer their innovative skills to working life.

Innovation pedagogy has been used in the local context for onsite teaching since its introduction in 2011, and is increasingly applied in online and blended courses; however, it has not been applied in the design of an online degree prior to this study. The pedagogical strategy and its features were integrated in the initial design and results are presented in [Table 3](#).

2.3 Organisational design

Consultations with various experts were used to support the organisation-wide implementation of the ODP design. The aim was to ensure the online degree design

principles and pedagogical strategy could be implemented in the context of the DigCompOrg. Collaborating with internal partners is important to ensure pedagogical and technical choices can be implemented and supported throughout the organisation in a standardised manner to support quality decisions, as found by [Swan *et al.* \(2014\)](#).

The experts of the organisation represent each of the elements in DigCompOrg framework and pedagogical strategy. Expert consultations were used to ensure representation from all aspects of the organisation, including core teams for each degree programme, core team of online degree coordinators, in-house technical support, support services, students and pedagogical team. The aim was to ensure that each solution and decision on pedagogy, technology or shared services for online degree level was based on organisational availability, applicability and shared good practice.

The consultations were an important part of the design process as fully online degree education had not been offered in the organisation prior to this, and hence lack of knowledge about ODP-specific requirements existed. This is in line with the service design principles, according to which service design is multidisciplinary, and therefore expertise required and used in the design process comes from various fields ([Moritz, 2009](#)).

[Table 2](#) presents the stakeholder groups involved in the initial design process.

The total number of participants in the design process was $n = 36$. In accordance with DBR principles, the researcher is an active participant in the design process that creates a close connection with theory and practice. The consultations were held as group meetings and the meeting notes were recorded as written documents by the researcher and saved on the organisation's shared drive. The participants were invited to the meetings by the researcher, and the purpose of the meetings (the design of new ODPs in the organisation) was explained to the participants.

The following section describes the results following the DBR process.

3. Results

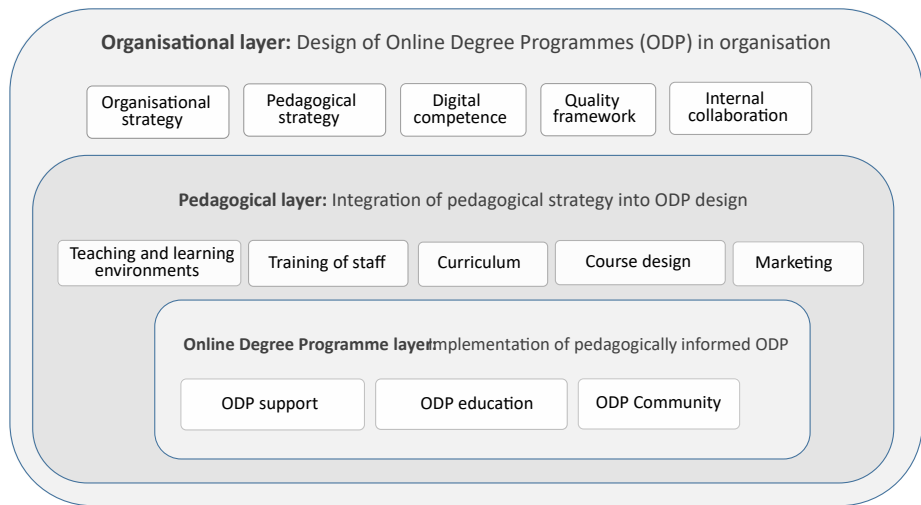
The results of the preliminary research were then placed in the three design layers to create design principles for the pedagogically informed holistic design of ODPs. [Table 3](#) shows the interconnection between elements of ODP design, pedagogical strategy and digital competence.

The key elements of the resulting design principles were then placed in a nested diagram that shows the interconnection between the three design layers. The first layer refers to the organisational level, where overall strategies of the organisation create the basis for the organisation-wide set-up for ODPs. The second layer refers to the pedagogical strategy of the organisation that creates the foundation for the implementation of the pedagogical approach in the structure and operations of the ODP. The third layer refers to the resulting ODP where it provides quality learning experience as part of a well-supported online community and ensures that the online degree education is experienced as intended in terms of organisational, pedagogical and digital strategy. [Figure 1](#) shows the elements divided into three layers of design.

The resulting design principles are summarised in the organisational, pedagogical and ODP design layers as follows:

- (1) Organisational layer: Choosing the organisation-wide strategic and pedagogical approaches of the ODPs in a digitally competent context
 - Choose strategic starting points for the ODPs, including pedagogical, digital and design strategy

Figure 1.
Three-tiered holistic
design of online degree
programmes in HE
organisation



- Check digital competence of the organisation for provision of strategic approaches in ODPs
 - Assess quality to ensure application of strategic approaches in ODPs
 - Collaborate for organisation-wide consistency in application of strategic approaches in ODPs
- (2) Pedagogical layer: Ensuring awareness and implementation of the pedagogical strategy in the structure and operations of the ODP in a digitally competent context
- Create online and on-site environments that support the implementation of the pedagogical strategy in a digitally competent organisation
 - Train staff to apply pedagogical strategy and utilise elements of DigCompOrg in implementing ODP education
 - Make elements of pedagogical strategy and digital competence visible in the curriculum design
 - Create design templates for the online learning environments that enable and enhance the implementation of pedagogical strategy in implementing ODP education
 - Market pedagogical strategy as a differentiator for ODPs in a digitally competent organisation
- (3) Online degree programme layer: Implementing online degree education to create a quality learning experience as intended in terms of pedagogical, technical and organisational strategy
- Provide continuous pedagogical, technological and organisational support for the staff and students in the ODPs
 - Provide ODP education that is consistent with strategic approaches and meets the quality criteria

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- Support the staff and students' well-being in belonging to an ODP community as part of the educational organisation

The above pedagogically informed holistic design principles for ODPs were created to be implemented in the design of the first ODPs in the organisation.

3.1 Discussion

This paper approached the ODP design from an organisational holistic point of view by combining DigCompOrg and pedagogical strategy of an organisation to ODP design. The DBR process was completed in a practical-oriented local context of a Finnish University of Applied Sciences, where implementing pedagogy and digital competence of the organisation in the new ODPs was the focus of the design. Management was involved in the stakeholder groups in collaborative design processes to ensure consistency in quality, as lack of management support was seen as a potential barrier to quality by [Bailey et al. \(2018\)](#) and their role was suggested as leaders of change in education by [Keinänen and Kairisto-Mertanen \(2019\)](#).

Whilst the organisational approach seems to support holistic design well, one possible issue with the organisational approach might be that the design places emphasis on the organisation rather than on the end-product. One possible solution could be to view the stakeholders in the design process as users. Indeed, [Stickdorn et al. \(2018\)](#) propose a holistic principle for service design and suggest that service is experienced by anyone using that service. Thus, future design iterations may focus on designing for service, not only on designing for organisation. Also, focus of design may shift to digital learning ecosystems ([Pöldoja, 2016](#)).

One possible problem with holistic design may be that it excludes disciplinary differences, which were considered important by [Carragher Wolverton and Guidry Hollier \(2019\)](#). [Benson \(2003\)](#) suggested that quality criteria should be defined in the context of the degree programme. In this study, the quality principles were not degree programme-specific, but instead the holistic approach meant that the quality was created at an organisational level and applicable to all degree programmes. Nation-wide best practices from different disciplines may be used to further improve the design principles for wider use.

This study focused on integration of pedagogy in all levels of ODP design by examining the use of pedagogical strategy of one HE organisation. Expert consultations were used to ensure the implementation of the pedagogical strategy in the digital context. [Rovai and Downey \(2010\)](#) found pedagogy to be one of the critical success factors for online programmes. In this study, we found that pedagogical strategy should be integrated in all levels of the ODP design when it is used as a strategic approach of the educational organisation.

In this study, the pedagogical strategy encompasses the programme and beyond the organisation to the working life, taking into consideration the needs of society ([Konst and Kairisto-Mertanen, 2020](#)). An interesting connection can also be made between the aim for a better life and sustainability in innovation pedagogy ([Konst and Kairisto-Mertanen, 2020](#)) and the demand for spirituality in terms of well-being and harmony amongst people and nature in inclusive education ([Bodhi et al., 2021](#)).

Support systems, infrastructure and internal collaboration important parts of providing online degree education in a digitally competent organisation. [Starke-Meyerring \(2010\)](#) found that global networks that utilise technology for participation place new demands for design of education, in comparison to on-site programmes. Therefore, future design iterations could include global online context where staff and students work in multicultural, virtual networks and create global connections using technology, further emphasising the need for digital competence.

Jefferies *et al.* (2007) suggested that the selected technology should support the pedagogical and ethical views, which can lead to better success rates of integrating technology to pedagogy. This view is supported by the findings of this study, where the pedagogical strategy is closely linked with the digital competence of the organisation to produce better-quality design outcome.

Future work predictions by World Economic Forum (2020) suggest that the COVID-19 crisis will have a major impact on those with lower education levels and will likely deepen the current inequalities. Artiles *et al.* (2006) suggest that innovative approaches are difficult to scale, as money is a factor that can compete with quality, as also identified by Rovai and Downey (2010). This study did not focus on administrative cost effectiveness but instead aimed to create organisation-wide quality through pedagogically informed design in a digitally competent context. It is important to consider how best to implement the chosen pedagogies and technologies in the local context, as they may vary in terms of availability, access and competence.

Several suggestions to managers, instructional designers and educators can be made from the results of this study. Firstly, HE organisations can adopt a pedagogically informed design approach by integrating their pedagogical strategy in the design of ODPs. Secondly, it is important for the organisation to evaluate their digital competence and the availability of their educational and support services in a fully online context. Thirdly, a wide range of organisational involvement, including management, in the stakeholder groups in collaborative design processes can ensure consistency in quality. Fourthly, by adopting the holistic approach, quality can be created at an organisational level instead of focusing on degree programme or faculty level. Finally, building the sense of community and offering continuous support in pedagogy and technology are valuable for the well-being of the staff, students and wider society.

3.2 Conclusions

The purpose of this paper was to identify principles for holistic design of ODPs in HE organisations that use a pedagogical strategy by using DigCompOrg (Kampylis *et al.*, 2015) as a framework. The design concerns those HE degree programmes that are entirely online and require the organisations' support services to be online as well.

This research is believed to be relevant in today's societal demands for increased online education and allows coordinators or leaders of ODPs to use a three-tier design with organisational, pedagogical and ODP layers. The design principles can be used by managers, administrators and educators of HE organisations that wish to start new ODPs with a pedagogically informed organisational holistic approach. The design can give organisations a good starting point for starting new, sustainable online initiatives in education.

The well-known African proverb 'It takes a village to raise a child' can be applied in the holistic design of ODPs, as it requires an organisation-wide view in collaboration with various stakeholders. The current COVID-19 pandemic has created a new, global demand for online education, making it essential for educational organisations to continue to develop fully online degree education.

It is the opinion of the author that pedagogically informed design must go firmly hand-in-hand with technology-driven development of online education. By adopting an organisation-wide pedagogical strategy in a digitally competent context, HE organisations make a commitment to their students and staff to offer high-quality online degree education that will benefit not only the organisation but the society as a whole. Sustainable future requires new solutions for education, and quality ODPs can be one important part of the ecosystem of learning between HE, society and working life.

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