

Design principles for MOOC platforms: a public sector perspective

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platforms

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Abstract

Purpose – One impediment of e-government implementation is the lack of e-government competences among public officials, especially because foundational education programs fail to teach them. Therefore, this study suggests massive open online course (MOOC)-based continuous education. This study aims to design and evaluate a MOOC and MOOC platform for acquiring e-competence in the public sector and principles for such platforms to capture their inherent design knowledge.

Design/methodology/approach – This study uses design science research incorporating qualitative and quantitative methods and draws on established patterns of formulating design principles (DPs).

Findings – The core results are a physically instantiated MOOC platform and six DPs: DP of 1) easy access and easy use, 2) professional exchange, 3) protected space, 4) domain focus, 5) cooperation with higher education institutions and 6) promotion from higher government level.

Research limitations/implications – This study contributes to e-government research by extending the design knowledge for the construction of domain-specific MOOC platforms. Moreover, the study contributes to platform economics by discussing existing theses and outlining new opportunities. The research also entails limitations, as the authors have solely considered MOOCs and neglected complimentary offers to sustain learning success.

Practical implications – This study provides practitioners with design principles they can use in their efforts to construct education platforms for the public sector. Moreover, the study presents a working MOOC platform instantiating these DPs, and thus provides an exemplary reference.

Social implications – Not fulfilling expectations regarding digital public services comes with a risk of decreasing trust in public organizations and the overall government. The results of this study contribute to enabling public officials fulfilling stakeholders' expectations and generating public value.

Originality/value – By linking e-government competence education with MOOC platform design, this research approximates an important research gap. Scholars previously investigated e-competences and focused on alone-standing MOOCs to convey those. The results of this study offer the potential to construct platforms to centralize such fragmented solutions, maximizing their impact among public officials.

Keywords MOOCs, Electronic government, E-government, Design science research, Digital government, Design principles, E-competence, MOOC platforms

Paper type Research paper



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1. Introduction

Public sector reforms have always been challenging as its organizations operate on several levels, are embedded in a complex mesh of stakeholders and are not faced with market competition. For about two decades, the next chapter of public sector reform has been predominantly related to digitalization (Layne and Lee, 2001; Wimmer, 2002), and many positive developments have come along with this transformation (Cordella and Bonina, 2012; Janssen *et al.*, 2012; Scholta *et al.*, 2019). However, despite this growing interest in research and practice, we can still see public organizations struggling with digitalization (Duhamel *et al.*, 2023), the permeation of e-government across agencies (Ramadani *et al.*, 2022) and the corresponding organizational transformation (Nograšek and Vintar, 2015). This is also reflected in an insufficient maturity of public sector digitalization in several countries (United Nations, 2020).

Many factors have contributed to this situation, and some are still a constraint to digitalization. Beyond structural obstacles like government structures, political and legal influences, especially the public officials who are in charge of adopting information systems (IS) for their daily work and are at the heart of any transformation, are worth consideration. Pursuing digital transformation requests an adequate change in skills and the workforce's mindset in the public sector, and consequently, it is about enhancing their ability to act in the digital environment (Distel *et al.*, 2019). Former competences have become obsolete, and a shift toward more competences reflecting digital literacy can be observed (Distel *et al.*, 2019) as this is heavily required "for a lasting change within the organization and bureaucracy" (Mergel *et al.*, 2019, p. 10). These new, digitalization-related competences, we call e-(government) competences (Gorbacheva *et al.*, 2016). We can observe two distinct paths posing the e-competence-problem. First, public organizations have not fulfilled the new competence requirements, i.e. by sufficiently skilling up the public workforce, incorporating required knowledge on technological developments. Second, (continuous) education in the public sector does not sufficiently acknowledge new opportunities and is still lacking a digital transformation for itself (Hofmann and Ogonek, 2018). Frequently, stationary and inflexible education and no dispersion into the respective curricula remain (Hofmann and Ogonek, 2018; Hunnius *et al.*, 2015).

To provide suggestions for solving these issues, we consider the massive open online course (MOOC) concept as an adequate educational means. MOOCs provide easy access to education to a large audience via online channels (McAuley *et al.*, 2010). Given the concentrated e-government knowledge in academia, we argue that alliances of research institutions and public sector institutions are in charge of forming new channels for education. Mass media education should be utilized to disseminate this knowledge to the target audience. Here, we advocate for a solution tailored specifically to the public sector because (1) search costs for public officials are too high with existing offers and platforms, and (2) the public sector is significantly different from the private sector that a "one-fits-all" approach would not address the complexity of the problem. However, as domain-specific MOOC platforms are barely observed in the market (Halsbenning and Niemann, 2021), the question regarding an appropriate *design* of such educational means has not yet been answered for the public sector domain and its digital transformation. Consequently, our research goals read as follows:

- Design and evaluation of a MOOC and MOOC platform for e-competence acquisition.
- Design and evaluation of design principles for such MOOC platforms in the public sector.

To meet these goals, we opt for a two-stage design science approach. We first design a classical artifact instantiation, which we then use as a vehicle for deriving design principles. Therefore, we follow the rationale to attract public officials by strongly considering the requirements arising from the public sector domain. As the solution approach of using MOOCs and the platform design is a challenging field itself (Reich and Ruipérez-Valiente, 2019), we embed our research into the existing literature on MOOCs.

The originality of our contribution emerges from the approach to integrate e-government competence education with platform design (De Reuver *et al.*, 2018), which have previously been disjoint fields. Although scholars have explored the use of MOOCs to convey e-competence (Dhungel *et al.*, 2021; Papageorgiou *et al.*, 2023), platforms' evident potential to maximize the benefit of alone-standing offers such as single MOOCs has been neglected so far.

The remainder of the paper entails related works and research background, the differentiation between MOOCs and MOOC platforms, our research approach, the findings of our research project, the discussion and concluding remarks.

2. Research background

2.1 Public sector digitalization and the role of public officials

Public sector digitalization – often referred to as e-government – generally describes the use of IS by public sector organizations (Lenk, 2002; Lindgren *et al.*, 2021). This broad understanding of e-government includes the provision of digital public services (Lukea Bhiwajee, 2023) as well as the transformation to digital administration as a whole (Lindgren and van Veenstra, 2018). The intention of this digital transformation is to improve both public administration processes and public service delivery (Yildiz, 2007). The digitalization of services for citizens and businesses on the one hand and of internal administrative processes on the other has consequently been coined as external and internal perspectives on e-government (Evans and Yen, 2006). Lindgren *et al.* (2021) further integrated that view and emphasized that public sector digitalization is largely influenced by the overall (legal, social, economic and political) environment, the digital infrastructure and policies and strategies (Lindgren *et al.*, 2021). Considering this environment, the public sector and its digitalization-induced organizational change face complex and interwoven challenges (Chou *et al.*, 2008; Nograšek and Vintar, 2015).

So far, one could argue that the digital shift within the public sector is comparable to the private sector just branded with domain-specific terminology and slightly different stakeholders. This view, however, fails to recognize the importance of the public sector to society and beyond. Consequently, the overall measure of its task performance is not maximizing profit and output by considering pure economic measures but the contribution to society – the public value (Moore, 1994, 1995). For e-government, this positive societal impact has already been specified (Duhamel *et al.*, 2023; Twizeyimana and Andersson, 2019). Therefore, it is important to point out the unique role of the public sector.

Domain understanding as previously outlined is essential to unravel the central role of the public official within the complex mesh of public sector digitalization. Public officials have been the traditional backbone of public administration since ancient times. They are vested with the power of the state, and their relationship with clients is characterized by an imbalance in favor of the public official (Kaufman, 2001; Rhodes, 2016). This can also be transferred to digitalization. In research, public officials have been assigned an ambivalent role as they can either facilitate or impede the beneficial implementation of e-government (Aikins and Krane, 2010; Chou *et al.*, 2008; Moon, 2002; Norris and Moon, 2005). The relevance of public officials for e-government success and its prosperity has already been

determined in the beginning of the e-government era (Gil-García and Pardo, 2005; Layne and Lee, 2001). Meanwhile, the digitalization-induced demands on new competences and mindset are widely acknowledged to form the basis for a sustainable change (Mergel *et al.*, 2019).

2.2 Conceptualizing massive open online courses and massive open online course platforms
“Massive Open Online Courses are online educational materials delivered via an electronic medium and offered freely and openly to learners” (Burd *et al.*, 2014, p. 37). In our research, we focus on xMOOCs (Fidalgo-Blanco *et al.*, 2016; Staubitz *et al.*, 2017), which are characterized by the following four properties:

- (1) *Massive* refers to a theoretically unlimited number of participating learners. Compared to conventional education offerings, MOOCs have high scalability without geographic or time restrictions (Leontyev and Baranov, 2013; McAuley *et al.*, 2010).
- (2) *Open* refers to the absence of access restrictions in terms of payments, qualification and affiliation (Siemens, 2013).
- (3) *Online* refers to the online (oftentimes even online-only) provision of the education content, like videos or presentations, and the interaction between and among learners and teachers (Leontyev and Baranov, 2013; Siemens, 2013).
- (4) *Course* refers to a defined setting in which the education activities take place including fixed start and end dates as well as contents, structure and tests set in advance (Siemens, 2013).

With the beginning of the 21st century, this MOOC concept emerged with a promise to offer access to higher education to all parts of society leading to a democratization of education and a new pillar for lifelong learning (Delic and Riley, 2020; McAuley *et al.*, 2010; Siemens, 2013). Borne by high expectations, MOOCs became a hype with rapidly increasing subscriptions, followed by decreasing participation and high drop-out rates (Baggaley, 2013; Reich and Ruipérez-Valiente, 2019; Skapinker, 2013). Essential in explaining this phenomenon was the recognition that MOOCs come along with high scale effects from an economic perspective but, in turn, those effects do not acknowledge the individual educational requirements – neither for learners nor for teachers (Hoxby, 2014; Kennedy, 2014). This core problem has been addressed by research but still remains partly unsolved (Adamopoulos, 2013; Hone and El Said, 2016; Huang and Lucas, 2021).

Our rationale behind using the MOOC concept aside those drawbacks is twofold. First, triggered by the grand challenges of our time, we can observe a drastic decrease of the (obligatory) on-site concept for work and education. Especially, the COVID-19 pandemic led to a wider acceptance and dispersion of remote work and education fostered by the general movement to new work (Nagel, 2020). Hence, we are faced with another world than 10 years ago (MOOC hype-phase), especially in the public sector. Second, we have different incentive structures within the public sector domain as previously indicated by the public value and power imbalance toward clients. As we can barely observe any domain-specific MOOC platforms, we explore a new approach by focusing on offering large-scale opportunities for a specific, limited target group (public officials). Therefore, it is important to view the MOOC concept in light from a platform perspective.

As the concept of multi-sided platforms (De Reuver *et al.*, 2018; Staykova and Damsgaard, 2015) provides the basis for broadcasting and consuming MOOCs, the platform approach has been widely adopted as it ensures a simple mediation between the core groups

of teachers and learners in education-environments (Kaplan and Haenlein, 2016). With MOOCs vitally relying on the platform concepts, MOOCs and digital platforms led to a dedicated market of MOOC platforms where emerging ecosystems and oligopoly structures can be observed (Halsbenning and Niemann, 2021; Rothe *et al.*, 2018). While the learner considers the content of a MOOC of critical importance (Rothe *et al.*, 2018), the functions of the digital platform (e.g. gamification and learning analytics) simultaneously determine the opportunities of the MOOCs hosted thereon. Hence, the importance of the platform design may not be neglected. Despite several researchers have called for more design knowledge on MOOC platforms (Fürstenau *et al.*, 2019; De Reuver *et al.*, 2018), this has hardly been taken up. Such design knowledge could aid practitioners and scholars to generate future paths for establishing MOOC platforms. This is particularly relevant to the public sector because domain-specific preferences are not yet reflected in MOOC platform development (Halsbenning and Niemann, 2021).

2.3 An e-government perspective on competence and massive open online course platforms

Existing research (e.g. Gorbacheva *et al.*, 2016; Nordhaug, 1993) defines e-government competence (e-competence) as “the combination of an individual’s work-related knowledge, skills and abilities” (Distel *et al.*, 2019) required to act in a digitalized public sector. These competences are rising concurrently with the driving digitalization. Nowadays, the needed competences are manifold and not bound to few technical skills but concerning public officials through all departments and all hierarchical levels (Lindgren *et al.*, 2019). For the past decade, scholars have continuously worked to investigate competence requirements for a digitalized public sector and established e-competence frameworks. For example, Hunnius and Schuppan (2013) differentiated generic- and core e-government competences, and Hunnius *et al.* (2015) suggested a framework comprising the five categories of technical, socio-technical, managerial, organizational and political-administrative competences. Moreover, scholars, e.g. Auth *et al.* (2021), have drawn on other digital competence frameworks for their work, such as DigComp 2.0 (Vuorikari *et al.*, 2017). As outlined above, our understanding of e-competences is based on the definition introduced by Distel *et al.* (2019), who suggest a broad understanding entailing both competences and personality traits. While those competence frameworks comprise a variety of e-competences ranging from competence in public policy to competence in cyber security (e.g. Distel *et al.*, 2019; Hunnius *et al.*, 2015; Hunnius and Schuppan, 2013), the focus of our research is given to a certain set of competences in the areas of *process management*, *project management*, *change management* or *strategic thinking* (cf. Chapter 4).

The utilization of MOOCs and MOOC platforms to facilitate e-competence acquisition is an underrepresented field of research. In fact, studies have already investigated the design of MOOCs in general leading to generic recommendations as *learner-centered design*, *engagement between learners* and *clear course structure* (Moore and Blackmon, 2022), but a more specific perspective is still necessary. However, recent scholarly efforts have begun to address the acquisition of specific e-competences through MOOCs. For example, Dhungel *et al.* (2021) investigated the necessary MOOC design for learning about artificial intelligence (AI) in the public sector and Papageorgiou *et al.* (2023) examined MOOCs’ potential to enhance public officials’ human capital, focusing on understanding open government data opportunities. While these contributions are important for acquiring specific e-competences, considerations on the design of MOOC platforms for educational purposes in the public sector, which could distribute such specific MOOCs, are lacking. Hence, the design and evaluation of platform-related design principles can be seen as a parallel effort to maximize the impact of alone-standing MOOCs.

3. Research design

In line with the objectives of this study to design and evaluate a MOOC and MOOC platform and corresponding design principles, we use a design science research (DSR) approach. DSR aims at the creation of artifacts to extend human and organizational boundaries (Hevner *et al.*, 2004). Its purpose, therefore, lies within the construction, evaluation and adaptation of such artifacts (Winter, 2008), e.g. design principles (Gregor and Hevner, 2013; March and Smith, 1995). Design research has been well-appreciated for IS research in general (Niederman and March, 2012) but for e-government and education research in particular. Goldkuhl (2016) pointed out that DSR can contribute to e-government research in several ways, for example by providing prescriptive knowledge to e-government solutions. Moreover, Chen (2011) highlighted the beneficial combination of DSR and explanation-based research. Several scholars established that DSR has proven to complement behavioristic research models by testing and improving educational practices iteratively through use in hands-on or real-world contexts (Brown, 1992; Collins *et al.*, 2004; Shavelson *et al.*, 2003). This includes the usage and development of innovative, digital learning formats (Bakker, 2018; Collins *et al.*, 2004) and has also been applied to MOOCs in the context of digital skills (Edelsbrunner *et al.*, 2022).

For the particular context of this research project, DSR seems well-suited for three main reasons. First, the need for e-competence acquisition, especially given the challenges the public sector faces, clearly constitutes a “real-world problem”. Rigorously collecting and analyzing data and thus providing scientifically designed artifacts depicting solution approaches to these problems have always been the core objective of DSR (vom Brocke *et al.*, 2022). Second, DSR is highly valued for its emphasis on the cycle of designing and evaluating innovative artifacts (Peffers *et al.*, 2012; Sonnenberg and Vom Brocke, 2012). Our research context offered several opportunities to evaluate artifact increments and integrate feedback into the further development, such as workshops, surveys and interviews. Therefore, using DSR as the overarching paradigm to integrate qualitative and quantitative methods appeared well-aligned with the objectives of this study. Third, a sole ex-post view on and analysis of established artifacts, i.e. MOOCs and MOOC platforms that have been stable under market competition, is subject to a *success bias* as such an approach falls short in analyzing failed or new innovative cases (De Reuver *et al.*, 2018).

We selected a processual DSR approach according to Peffers *et al.* (2007), which entails a process consisting of six phases. We partly execute the DSR process iteratively to be able to integrate each iteration’s evaluation results into the subsequent design phase (cf. Figure 1).

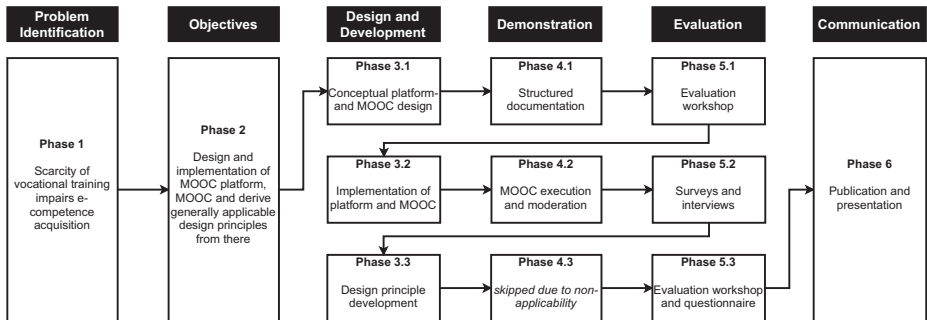


Figure 1.
Research design

Source: Created by authors based on Peffers *et al.* (2007)

Phase 1 – Problem identification: Today's public administration is heavily challenged by the digital transformation, which makes the acquisition of e-competence imperative. Existing education programs do not seem to meet this requirement.

Phase 2 – Objective definition: Based on Phase 1, the first research objective was to design and implement a MOOC platform that tackles the aforementioned problems. The second objective is to process the findings of this instantiation further to derive generally applicable design principles, which scholars and practitioners can use for implementing such offers. Design principles are considered indispensable for communicating design knowledge (Chandra *et al.*, 2015), as they make results tangible and usable and improve the development and implementation of IS. Design principles entail what is unique to design knowledge: prescriptive knowledge that presents a distinct structure of how to do things (Gregor *et al.*, 2020). The implementation of the platform and a MOOC can thus be regarded as an elementary step in the design process; however, it serves primarily as a vehicle to derive the design principles.

Phase 3.1 – Design and development: We designed the platform conceptually, entailing the definition of target groups, requirements and the establishment of public sector-specific requirements of the platform and its contents.

Phase 4.1 – Demonstration: The results were transformed into corresponding documents and presentations, presenting a holistic concept of the platform's nature, contents and desired effects on the target group.

Phase 5.1 – Evaluation: The documents were evaluated in a workshop. Nineteen participants [e-government scholars, practitioners (target group), didactic experts and users (teachers)] were brought together to discuss the concept.

Phase 3.2 – Design and development: Actual development of the MOOC platform, incorporating theoretical insights and the feedback of phase 5.1. To instantiate the platform's content, we designed and produced a fully matured MOOC available for public officials (66 videos, each between 5 and 15 min; 41 interactive tasks; 22 quizzes).

Phase 4.2 – Demonstration: The demonstration happened in a real-world setting (Venable *et al.*, 2016). Public officials could freely sign up for the platform and the MOOC. The only prerequisite to partaking in the offer was German language proficiency, as the contents were provided in German. Further details of the conceptual setting will be outlined in the next chapter.

Phase 5.2 – Evaluation: We followed a mixed-method approach of data collection (Creswell, 2014; Creswell *et al.*, 2003) for a naturalistic evaluation (Venable *et al.*, 2016). This included a start survey (motivation/ambition) and end survey (qualitative aspects of the offer, including the perceived effect of the contents or the perceived benefits of the platform approach; $n = 112$ – 126 depending on item) as well nine semi-structured interviews. We interviewed seven learners who completed the MOOC and two who did not. The average duration of the interviews was 48 min. The interviews were recorded, transcribed, coded and analyzed (Mayring, 1994). The interviews were designed to last 60 min and included a range of questions, allowing for additional follow-up inquiries and deviations from the planned interview guide.

Phase 3.3 – Design and development: Six design principles to adhere to when implementing MOOC platforms for the education of public officials were derived in this phase based on a reflective approach of principle development as suggested by Möller *et al.* (2020). When designing, i.e. formulating, the principles, we adopted a scheme as prescribed by Chandra *et al.* (2015), including 1) material properties, 2) activities of users and 3) boundary conditions.

Phase 4.3 – Demonstration: This phase is rather theoretical in the design process, because, with the design of design principles, we have created an intangible artifact. Hence, phase 4.3 was omitted.

Phase 5.3 – Evaluation: The design principles were evaluated in another workshop (same participants as in phase 5.1). The afterward slightly revised DPs were cast into a questionnaire (five-point Likert-scale) and distributed to three e-government experts from academia for final evaluation with respect to their contribution to successfully designing education platforms for public officials.

Phase 6 – Communication: Communication of the results in academic literature.

4. Conceptual setting – an overview of platform and massive open online course

The MOOC platform has been developed aiming to fulfill the outlined design objectives. Development here explicitly does not mean the technical implementation of an IS from scratch but the adaption of a well-established framework (Totschnig *et al.*, 2013; Meinel and Schweiger, 2017) for MOOC platforms to the requirements of this project. The platform can host different MOOCs. All MOOCs have been developed by higher education institutions, have a strong relation to public sector digitalization subjects and thus foster the acquisition of e-competence. Each course consists of learning videos and interactive test elements. For this project, a MOOC on business process management (BPM) in the public sector was developed, which plays a key role in digital transformation (Kregel *et al.*, 2022) and is therefore considered an important e-competence (Distel *et al.*, 2019; Hunnius *et al.*, 2015; Hunnius and Schuppan, 2013). The topics of the MOOC cover the basics of BPM, procedure models for BPM projects, process modeling, change management and the potentials for automation. In total, the MOOC comprises ten learning units, each containing various lecture-like videos with durations ranging from 5 to 15 min. Each video is followed by interactive tasks (such as filling in blanks, drag-and-drop exercises or multiple-choice questions), providing learners with immediate feedback on their progress. The course also includes “additional material,” offering learners complex modeling examples and explanations of process mining algorithms. The platform is freely available under the name “eGov Campus” (Halsbenning *et al.*, 2021) and the course is titled “Process Management in the Public Sector” (German: “Prozessmanagement im öffentlichen Sektor”).

One learning unit was activated per week. Once activated, videos and exercises were available for the remaining time of the course duration. After the last learning unit, there was a final test. Depending on their participation in tests, users could achieve either certificates of attendance or (if they passed the tests) additional performance certificates. A forum served for users to get in touch with each other and discuss contents. The research team actively monitored the forum, aiding the participants in case of ambiguities or clarifying issues. Users were completely free in their decision to schedule their learning progress. Due to the short time frames of videos and exercises, users were able to blend the MOOC into their everyday lives flexibly.

Visually, the platform resembles state-offered education opportunities, for example by incorporating national colors. A seamless corporate design was developed that aligned the platform and the thereon hosted MOOCs. A particular focus was laid on the bold display of involved institutions of higher education and their teaching staff. Usability-wise, users could freely browse through the platform’s and MOOCs’ informational content. For the MOOC relevant to this research project, 616 individuals enrolled when it was first announced. This number rose to 1,220 until the MOOC ended (i.e. the last exam period had passed). The great majority of learners originated directly from public organizations. A rather small share of

users stemmed from private sector organizations that are collaborating with the public sector (e.g. consultancies).

5. Results

This section aligns with our dual research goal: to design and evaluate a MOOC and MOOC platform for acquiring e-competence in the public sector and to design and evaluate design principles for such platforms. We will first address the insights for the MOOC and the MOOC platform, followed by the main contribution of this paper: six detailed design principles derived from our iterative research process.

5.1 Massive open online course and massive open online course platform

In the first evaluation (workshop), we received recommendations for the didactical outline and the integration of digital means for assessment purposes was highlighted. In order to reach the target group of public officials, it is important not only to offer them added value but also incentivizing decision-makers to let employees participate. Despite minor recommendations, the general course and platform concept were positively assessed.

The second round of evaluations considered the learners' perspectives and revealed an overall positive attitude toward the MOOC (cf. Table 1) and the MOOC platform (cf. Table 2).

In the interviews, two design-relevant aspects for those exercises were raised. First, the immediate, automated feedback motivated the learners' impulses – as intended. Second, this type of exercise overcomes a missing open culture of error as two interviewees mentioned:

[Those exercises] still have the advantage that no one will notice what kind of a mistake I might make.

My perception is that there is no open culture of error, especially in the target group of public administration.

As the quality of the offer is one vital factor contributing to the attractiveness of the MOOC and the respective platform this is always to be considered in designing such offers. However, beyond didactical aspects, we found further aspects to be appealing to the target group.

Question/statement	+	O	-	Mean	SD	n
	(%)	(%)	(%)			
Through the course, I have acquired new competences	86.44	11.86	1.69	4.22	0.72	118
I liked the learning offer	92.86	3.97	3.17	4.49	0.79	126
The alternation of learning videos and exercises supports my learning	91.20	4.80	4.00	4.35	0.82	125
The division into small learning units boosts my motivation	92.80	4.80	2.40	4.47	0.80	125
Time flexibility is very important to me in educational opportunities	97.48	1.68	0.84	4.76	0.57	119
The flexibility of the MOOC course offers a great advantage over conventional learning opportunities	89.08	8.40	2.52	4.47	0.79	119
The focus of the offer on the public sector has made it more attractive to me	83.05	13.56	3.39	4.25	0.85	118
I think the opportunity to interact with other participants and network is important	42.02	31.93	26.05	3.13	1.07	119

Source: Created by authors

Table 1.
MOOC: Learners' perceptions and evaluation

Table 2.
Evaluation of the
MOOC platform

Question/statement	+	O	-	Mean	SD	n
	(%)	(%)	(%)			
Offerings such as this platform help to spread digital skills in the public sector	92.37	7.63	0.00	4.35	0.62	118
Offerings such as this platform are easier to integrate into my everyday life	99.11	0.89	0.00	4.75	0.46	112
Government funding promotes the trustworthiness of the platform	72.32	19.64	8.04	3.96	0.98	112
The anchoring of the platform in the university environment conveys credibility and seriousness	89.29	9.82	0.89	4.38	0.74	112
I would have found the same offers on other platforms/channels	3.57	27.68	68.75	2.07	0.87	112

Source: Created by authors

The flexibility of the training offer is of great importance for public officials, as both survey results and interviews indicate:

For me, this is a key point. I'm not dependent on my employer giving me a specific time when I'm free to do this, so to speak, but I can arrange it for myself as it suits me at work. Or even if I say: I have so much to do at work at the moment, I can't do it, I can do it on the weekend or in the evening. That doesn't work with fixed appointments.

Another interviewee argued that using the MOOC platform caused fewer overhead costs:

That's really very convenient right now because it simply eliminates these travel costs and these travel requests. And everyone can get information online a bit more flexibly and individually on the topics that really interest them and that really help them. Those [face-to-face] or hybrid offers are always a bit difficult for us.

The strategy of positioning the platform in a domain-specific niche has also been widely acknowledged:

The platform is more specifically tailored to my interests as an employee in public administration. Registration and participation are easier compared to other MOOCs as there are obviously no fees or (hidden) economic interests of the provider behind the offer.

Here, the statement also refers to the approach of cooperation with other (renowned) organizations. From the learners' perspective, especially the anchoring in the university environment conveys a feeling of credibility – similarly the government promotion:

So that was also one of the reasons why I came up with it because I had seen that many universities are also in the alliance [. . .]. But also, of course, because the [public organization] and the federal government are also involved.

Embedding the platform into such a research/public environment as well as strongly presenting that cooperation to the outside world has been highlighted from both platform core perspectives – in the workshops (teachers, practitioners, etc.) and by the survey respondents/interviewees (treated learners). The overall appearance and positioning on the market turned out to be very important for the platform to address the target group.

Based on the survey data, opportunities to connect to peers for professional exchange were not rated as key requirements for a MOOC platform:

That's what I appreciate about other formats, which is actually not the case here. That is this networking, where I get to know people with whom I can exchange ideas again at a later date, where

I then say: We got to know each other through this, how do you do it in your [local administration]? That's what I always find very valuable.

5.2 Design principles for e-government massive open online course platforms

As a result from the design iterations and the evaluation insights, we formulated design principles based on the recommended structure by [Chandra et al. \(2015\)](#). Even though some overlap cannot be avoided, the following design principles do not offer any intended internal relationships, dependencies or hierarchy:

5.2.1 DP 1 – Principle of easy access and easy use

Provide the platform with minimum-barrier ways to view and utilize the platform, its offers and its functions in order for users to be able to take up the platform's offer independent of financial or personnel resources and conditions, given that the administrative capacity and budget to enable the participation in similar offers are very limited from a sponsor's point of view, which often creates enormous barriers of entry for those individuals, who wish to partake in such offers.

DP 1 ensures a lightweight entrance considering the individual (e-competence acquisition) and the employer organizations (staff upskilling, low administrative overhead, reduction of transaction costs and decreasing budget competition).

5.2.2 DP 2 – Principle of professional exchange

Provide the platform with means to enable exchange and communication between users in one-to-one, one-to-many and many-to-many relationships in order for users to be able to get in touch with each other to lay the foundation for establishing professional relationships, potentially reaching beyond the platform's boundaries, given that the platform's purpose is to attract users whose professional background lies within a shared field.

DP 2 ensures an exchange of experience among the learners. On a MOOC platform, many public officials are gathering providing potential for sharing experiences beyond the classical competence acquisition.

5.2.3 DP 3 – Principle of protected space

Provide the platform with the possibility to privately work on content with the active user being the sole recipient of system output and feedback in order to give users a dedicated safe space to deepen their knowledge without having to expect judgement by fellow users or third parties, given that the individuals using the platform are most likely new to a topic and need to build initial confidence in their abilities.

DP 3 ensures learners to assess their acquired knowledge and skills without being exposed to negative consequences. They rather benefit from unlimited, self-paced practicing via digital, automated exercises.

5.2.4 DP 4 – Principle of domain focus

Provide the platform with courses and content that are focusing on public sector subjects in order for users to reduce search costs and thus create synergies by pointing them to complimentary content offers, given that current learning opportunities do not offer centralized, domain-specific content to individuals, which hinders them from finding similar courses relevant for them.

DP 4 ensures to attract public officials by providing domain-specific content and thereby creating high identification with the platform. A MOOC platform for the public sector can occupy a market niche.

5.2.5 DP 5 – Principle of cooperation with higher education institutions

Provide the platform with content developed and offered by renowned education institutions in order for users to recognize the quality of the offered courses and to increase sponsors' trust in the offer provided, so that they are willing to release their staff for training given that online offers need strong signals to indicate their reliability and quality to compete with traditional offers.

DP 5 ensures to convey trustworthiness and to signal quality by using a reputation transfer from higher education institutions. The platform for the public sector embodies a higher value to the outside world through this cooperation.

5.2.6 DP 6 – Principle of promotion from higher government level

Provide the platform with visual indicators, e.g. logos and corporate design, that resemble supporting governmental entities' visual appearance in order for users to recognize these patterns and thus build initial trust into the offer given that members of the public sector community are more likely to get involved in an offer if it appears to be coming from the very same institutions, the individual works for.

DP 6 ensures that the platform is perceived as an educational offer from the “public sector family”. The platform raises its attractiveness as public officials can identify themselves with it and must not fear hidden economic interest.

The evaluation of the design principles comprises an overall positive impression, with four DPs having a mean of at least four points and one (DP 3) with a neutral overall assessment [cf. Figure 2, which was inspired by Giessmann and Legner (2016)]. For DP 2, one professor argued that this DP goes beyond the purpose of educating, however not questioning the purpose in general:

The learning content is enriching even without participant exchange. Other formats (conferences, communities, etc.) can be used for networking, especially since networking in the MOOC format would involve (expensive) support formats.

For DP 4, one professor recommends also considering domain-independent content and preparing it accordingly. This does not touch the general purpose of the clear domain focus as the design principle focuses on the overall dedication of platforms, which offers some leeway in the exact composition of offered MOOCs.

If topics outside the public sector are also relevant to it, they should certainly be allowed to come up, but with use cases/examples focused on the public sector.

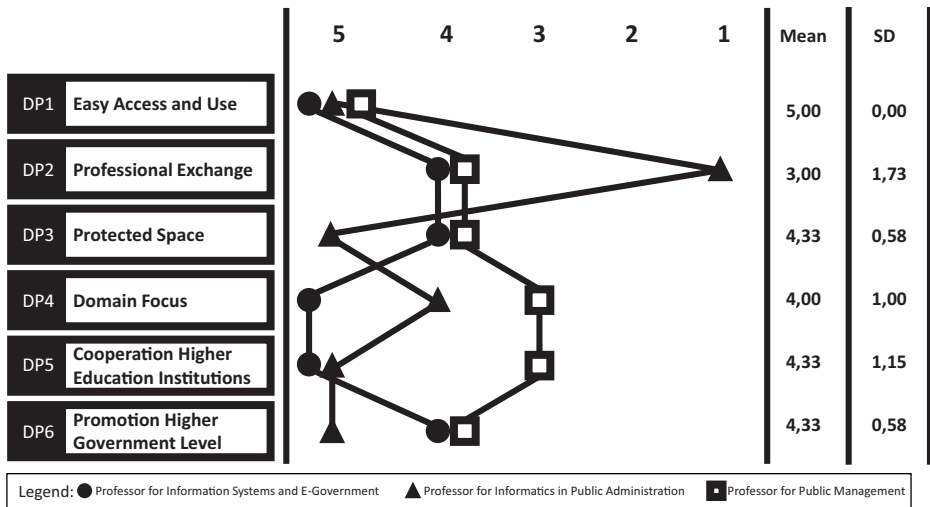


Figure 2.
Results of the expert
evaluation

Source: Created by authors

Finally, for DP 5, one professor argued, that the offer should be opened for further education levels and be designed accordingly.

I agree with the image/confidence argument. The problem is that [...] a course for practitioners is not for master's students, etc. Therefore, I think it would be better to allow differentiation and specific offers for target groups and not to pretend that the courses are (designed) for "everyone".

6. Discussion

With our research, we map e-competence (education) requirements to the design of MOOC platforms, revealing new insights to both fields.

6.1 Research implications

The results of this study contribute to two major streams of research: research on e-government, e-competence acquisition in particular and research on MOOC platform economics. The aim of our research was the design and evaluation of a MOOC and MOOC platform for the acquisition of e-competences and the design and evaluation of corresponding design principles for the construction of such platforms. With this two-stage approach, we contribute a situated instantiation of a MOOC platform for e-competence acquisition (Level 1-Contribution) and, at the core of this paper, design principles (Level 2-Contribution) (Gregor and Hevner, 2013). Those DPs capture design knowledge about the necessary actions in designing MOOC platforms to attract public officials for enhancing their e-competence. The design principles represent an important contribution to the question of how existing knowledge of e-competences can be made available to public officials and, thus, enforce the acquisition of e-competences among the public sector workforce. In the past, scholars have mainly focused on either answering the questions of which competences are considered e-competences (Distel et al., 2019; Hunnius et al., 2015; Hunnius and Schuppan, 2013) or exploring how MOOCs must be designed to facilitate the acquisition of specific e-competences (Dhungel et al., 2021; Papageorgiou et al., 2023). While these studies raise intriguing questions and address key topics, their results are hardly operationalizable without an appropriate context, such as a platform. Therefore, the provision of design principles for the construction of public sector-specific MOOC-platforms adds to the body of knowledge of e-competence acquisition by integrating previous findings and outlining a platform-based solution to centrally host MOOCs, maximizing their impact and providing a unified solution for e-competence acquisition.

Considering platform economics, the concept of a domain focus partly contradicts the classical, emerging monopoly/oligopoly structures in the MOOC platform market (Halsbenning and Niemann, 2021). Here, the design science approach is valuable to receive a new perspective on the platform design as retrospective analyses are not capable of figuring out new strategies, thus, contributing to the call for further design studies for digital platforms from De Reuver et al. (2018). The results presented within this study offer some interesting insights concerning the intersection of platform education research and public sector research as a niche field. As presented in the results chapter, the learners are very content with the platform, the MOOC and their learning progress. With these outcomes, we can add to a research stream concerned with reputation transfer. Scholars contributing to this stream argue that platform providers can benefit from importing reputation onto the platform and thus build trust among the target group. Such trust-building is achieved through signaling (reduction of uncertainties by sending signals) (Teubner et al., 2019, 2020). In our case, reputation on the platform was imported by two means: first, we incorporated higher education institutions (DP 5) and second, we made the platform visually appear in the looks of an official governmental offer (DP 6). Both together are likely to have built trust

among the target group, as the learners' uncertainty toward the MOOC platform has decreased with the perception of these two signals. We therefore can confirm the applicability of this theory to MOOC platforms in the public sector.

Furthermore, we can draw from economic arguments around niche markets to explain the success of the MOOC platform and the MOOC among the target group (Noy, 2010; Ou and Chan, 2014; Rao *et al.*, 2004). Even though there is a variety of MOOC platforms on the market already, the one created within this research project aimed at a very specific target group (public sector employees) with a very specific objective (acquisition of e-competence). This specificity impressed the target group as there was an optimal fit between the target group's requirements and the content offered on the platform. The niche character of the platform did not lead to invisibility or a too narrow target group but to efficient utilization of the target group and its potential.

6.2 *Practical implications*

Practitioners benefit from our research in two ways: using the DPs as guidelines and referring to the existing MOOC platform for reference. Based on the different data sources, i.e. people with different perspectives on public sector education, contributing to shaping the artifacts and evaluating them, we argue that those DPs are a stable design knowledge contribution (Carlsson, 2006). Continuous education in the public sector, especially in e-competences, has long been undervalued. However, current demographic developments and the "fight for talent" on an employee-favoring job market present significant challenges for public organizations in terms of workload and efficiency. Consequently, digitalization and digital transformation (Mergel *et al.*, 2019), and the required individual and organizational competences, have become focal points. Strategic staff development in the public sector has come to realize that a one-fits-all approach for continuous education in e-competence acquisition is outdated. Instead, acknowledging public officials' varying needs, the landscape for continuous education must offer flexibility and individuality. Based on this understanding, practitioners can use the DPs to construct education platforms for maximum impact. Without creating an environment that attracts public officials to use continuous education offers, merely providing content will not suffice to drive e-competence acquisition. The DPs from this research offer guidelines to create this very environment envisioning platforms that public officials are motivated to use, especially when they are inclined toward digital continuous education.

Furthermore, realizing that abstract design principles can sometimes be challenging to apply in practice, the platform developed in this research project (eGov Campus) (Halsbenning *et al.*, 2021) serves as a practical reference when creating new platforms. As it is one of the few large-scale endeavors for this domain to scientifically develop (continuous) education formats according to the zeitgeist, it can be used as an example for future projects. Considering the large potential audience, opening up MOOC platforms as a new tool for the highly needed education initiatives in the public sector provides a major opportunity and vehicle to enforce e-competence acquisition.

In terms of existing offers of education platforms in the public sector, it is worth highlighting a couple of particular insights gained from the results. The target group, public officials and individuals working within or closely related to the public sector, values a striking national-governmental branding. The survey and interviews revealed that the corporate design of the platform's logo and the MOOC, which resemble public institutions, was perceived as trust-building and high-quality. Concerning the respective design principle (DP 6), leaders charged with implementing educational platforms for this target group should exploit this insight and consider (re-)branding their offers. The reliable connection

that public officials seemingly feel to their professional environment and their employers can be used to make educational offers stand out among the masses. With a great variety of MOOC platforms, thousands of MOOCs and other video portals (e.g. YouTube, Vimeo), it can be challenging and overwhelming for public officials to find individually suitable content. These search costs should be avoided, as they are likely to result in the potential learner aborting his/her endeavor to acquire new e-competence. Visual elements and a resembling branding that unambiguously signal the potential learner to offer what he/she searches for (in this case, e-competences for public sector digitalization) can help reduce these search costs and thus directly assist in acquiring e-competence.

6.3 Social implications

Often, the purpose of e-government and e-competence is discussed from a managerial, efficiency-oriented point of view. However, one may not forget that this quest for efficiency is no end in itself. Public administration, especially on the local level, and its performance are often considered the direct interface between the citizens and businesses and the government as a whole (Nemec and de Vries, 2015). Therefore, the degree to which public administration is capable of fulfilling stakeholders' requirements in terms of digital public services has an immediate effect on the overall perception of public administration (MacLean and Titah, 2022; Schwab *et al.*, 2017) and even on the amount of trust individuals and businesses place into the government (Tolbert and Mossberger, 2006). These considerations in particular, but even the considerations regarding the original purpose of administration, providing public value (Moore, 1994, 1995), must be taken into account when contemplating e-competence acquisition (Duhamel *et al.*, 2023). Therefore, our results mediate also impact the public officials' competence to fulfill stakeholder requirements, maintain government trust and generate public value.

6.4 Limitations

Our research also entails limitations regarding research focus, methodological approach and evaluation audience. We focused on how to attract public officials to use the platform according to their preferences. The instantiated artifacts were evaluated positively, and the majority of participants also reported an improvement in their personal competences. In the experimental setup, only the individually *perceived* development of competences could be queried by means of surveys. Although scientifically established didactic and pedagogical standards were applied, the testing of a change in competences is reserved for future research. With MOOCs, we also have only investigated one branch of education, which calls for complimentary offers to sustain the learning success and to consider persons with differing preferences or disabilities. As the conceptual setting has been outlined in German language, the contributors to the evaluations were all German-speaking albeit also having different nationalities.

7. Conclusion

In this research project, we used a DSR approach to design and evaluate a MOOC and MOOC platform for e-competence acquisition and corresponding design principles. At the core of our results, we present six design principles for the construction of public sector-specific MOOC platforms, which contribute academically to the design knowledge on domain-specific education platform design and enforced e-competence acquisition, depicting an important discourse in the field of e-government. For practitioners, we offer distinct guidelines what to consider when either newly setting up or reconstructing existing education platforms. Additionally, with a fully matured MOOC platform, we provide a practical reference for the instantiation of these guidelines.

The design principles namely are as follows:

- DP of easy access and easy use;
- DP of professional exchange;
- DP of protected space;
- DP of domain focus;
- DP of cooperation with higher education institutions; and
- DP of promotion from higher government level.

For future research, four main activities arise. First, scholars must investigate how MOOC education can be embedded into more traditional learning settings. While we showed that MOOC platforms and MOOCs offer great potential to further develop e-competences in the public sector, one must not neglect the advantages of personal education and face-to-face interaction. Therefore, we must set out to create hybrid learning formats, combining the best aspects of both worlds. Second, our findings from the design science study are to be complemented by other research approaches. This research can either focus on the individuals using the education offer or on the platform economy. For instance, it is of interest, whether the perceptions about the MOOC platform differ across people of different ages, positions or gender. Regarding, the recommended market outline, i.e. the public sector niche, further studies could evaluate the long-term success of such strategies. Third, the transferability of our findings to other domains or education levels needs to be investigated. For example, it is of utmost interest, how far our findings for the public sector are different compared to private sector counterparts. Beyond opening these new research objectives to the scientific audience, our contributions pave the way for reconstructing (continuous) education for public officials in the digitalized era. Fourth, given the diverse range of occupations and tasks in the public sector, complementary research should be conducted to better understand individual or role-specific needs for e-competences. This would ensure that each public official can be equipped with the precise competences needed for their unique function.

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