Design Principles for a Higher Education Course Focusing on Lifelong Learning

Karin Brodén[1], John Johansson[1], Linda Bergkvist[1], Niklas Humble[2] and Peter Mozelius[3]
[1]Karlstad University, Sweden
[2]Uppsala University, Sweden
[3]Mid Sweden University, Sweden

karin.broden@kau.se
john.johansson@kau.se
linda.bergkvist@kau.se
niklas.humble@it.uu.se
peter.mozelius@miun.se

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Abstract: Lifelong learning for solving work assignments is essential for societal and personal development. Higher education is one natural part of lifelong learning and, therefore, needs to be re-focused from solely younger students to include professionals and their development goals. One problem related to giving a course for professionals is their struggle between work assignments and the course. Focusing on the added perspective of professionals for higher education, this study presents five design principles for courses for professionals. Design principles are guidelines based on experience and iterative development in higher education. The empirical data comes from a course in digitalisation and digital transformation, which was given thrice. The course participants were professionals from private and public organisations in Sweden. The empirical data originates from the professionals who made a check-in, mid-term evaluation, and evaluation after the course, resulting in 75 entries. Two researchers analysed the first two course entries inductively, forming the foundation for the first round of design principles. The course design for the third round was then revised according to its weaknesses. Based on the strengths and weaknesses found in empirical material from all three courses, the current design principles are *professional pathways* referring to new knowledge directly linked to real-world applications, *knowledge evolution*, meaning gradual integration of knowledge using seminars and examination assignments, *preparedness protocol* focusing on updated information and structured templates for the seminars. Further, the design principle of *collaborative connection* includes discussion where professionals exchange experiences, and the last principle, *learning fusion*, directs toward blended learning by combining face-to-face seminars and films. The revised course design, according to the design principles, implied that the number of professionals graduating and their grades increased. The findings of this study add theoretically to existing knowledge and practical implications by providing design principles that higher education teachers and other stakeholders can use to design or revise professional development courses. The design principles could be used stand-alone or combined to increase professionals' learning and satisfaction.

Keywords: Design principles, Lifelong learning, Higher education, Digital transformation

1. Introduction

In our emerging contemporary knowledge society, lifelong learning is an essential and continuous process involving the human work life. Higher education is an essential part of lifelong learning and broadening its perspective. This requires higher education to rethink pedagogy and didactics for a course design tailored for full-time working adults (Mozelius, 2022). As highlighted by Kennedy (2016), lifelong learning is essential and can, at the same time, improve the existing learning and teaching practices. Moreover, lifelong learning strongly contributes to the current knowledge society.

Furthermore, lifelong learning is a fundamental building block in the ongoing digitalisation of society in areas such as healthcare (Konttila et al., 2019) and technology-enhanced education (Mozelius and Humble, 2020). Previous studies have pointed out that work-integrated upskilling and reskilling should accommodate learners' personal and work lives with a course design different from the traditional (Daugherty and Custer, 2012; Mozelius and Humble, 2020). Knowles, Holton and Swanson (2014) emphasised that the more experienced adult learners participating in professional development often have unique and different educational needs than Bachelor's or Master's students. One example is that adult learning often needs to be more self-directed, life-related, contextual, and have intrinsic and personal values to satisfy the adult learner (Knowles, Holton and Swanson, 2014). Therefore, the design principles for a course for adult professionals should differ from those for bachelor's, master's, or PhD students. However, lifelong learning in the digital era is far from a mature

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concept. As Håkansson Lindqvist, Mozelius and Jaldemark (2024) pointed out, there is a complex need to transform higher education to meet the contemporary needs for lifelong learning. What also acts like a catalyst for this transition of lifelong learning is the emerging field of generative AI, which opens opportunities and, at the same time, requires further changes (Chiu, 2024; Rawas, 2024; Yusuf, Pervin and Román-González, 2024). The rationale for this study is the need for a better understanding of which design principles (DPs) can improve the implementation of lifelong learning in a digital era.

This study used the design science research method to design, develop, and evaluate DPs. The DPs were based on data from a higher education course for full-time working professionals aiming to develop their digitalisation and digital transformation skills. To be accepted for the course, participants must have at least two years of work experience in digital transformation. This study aims to analyse, present, and discuss DPs for a professional development course in higher education focusing on digitalisation, digital transformation, and data-driven organisations. The research question that guided this study was:

What design principles could lecturers and course developers follow to design a higher education course for professionals that facilitates lifelong learning?

The paper's structure includes an introduction to DPs, a description of lifelong learning, the study's context, a method description, the creation of design principles, results and discussion, and a conclusion.

2. Design Principles

Gregor, Chandra Kruse and Seidel (2020) view DPs as prescriptive knowledge and emphasise the goal of a DP to reach the user's aim in a specific context and provide the rationales behind the mechanisms. The results from the DP are socio-technical artefacts, such as design patterns for information systems and analysis patterns for business schemas or technical norms. Gebka, Crusoe and Ahlin (2021) specify design principles as including objectives, activities, and deliverables for a co-creation method; in their context, information needs for citizens in various situations. In higher education, the goal of DP can be to synthesise knowledge and express it as guidelines (Kali, Levin-Peled and Dori, 2009). In the form of guidelines, the DP is viewed as experience from previous knowledge that is generalised and replicable. The DP is found inductively from successful activities and revised over time.

There are several example sets of DP related to higher education. One set of guidelines includes flexible and modularisation, personalisation, collaborative learning, real-world application, continuous assessment and feedback, and technology integration (Molenda, 2003; Allen, 2016). These guidelines can be found in design approaches, described on various detailing levels. Examples of the guidelines are ADDIE (Analysis, Design, Development, Implementation, Evaluation) and SAM (Successive Approximation Model). Karlgren, Paavola and Ligorio (2020) add the perspective of lifelong learning in higher education and emphasise the following set of DPs:

- Organising activities around shared 'objects', such as prototypes, practices, or processes
- supporting the integration of personal and collective agency and work through developing shared objects
- emphasising development and creativity in working on shared objects through transformations and reflection
- fostering long-term processes of knowledge advancement with shared objects (artefacts and practices)
- promoting cross-fertilisation of various knowledge practices and artefacts across communities and institutions
- providing flexible tools for developing artefacts and practices

van den Berg (2019) created DPs for HE courses focusing on digital innovation skills. Those DPs aim to ensure collaboration, create a learning environment that encourages adaptability and flexibility by encouraging experimentation, implement a formal process of reflection, enable the development of ethical awareness, implement integrated, authentic assessments, and apply project-based learning to combine inquiry with accountability. The primary aim for this set of DPs is collaboration, which is viewed as the primary influencer for success when it comes to innovation.

3. Lifelong Learning

The role of lifelong learning in higher education has been frequently debated during the last decades. In contemporary knowledge society, most parts of the world are in high demand for reskilling and professional development. This challenge requires continuous lifelong learning, and traditional university programmes must be redesigned to support this continuous lifelong learning. This includes a higher education pedagogy and course design considering lifelong learning students may have different educational needs and expectations than the typical student (Humble and Mozelius, 2021). For example, study groups could support professionals as students by exchanging information, discussing issues, and relating learning to their professional practice (Mozelius and Humble, 2020). As highlighted by Lang (2023), this is a reformation that higher education must address in a reform that must involve inclusion and support equitable and flexible quality education (Atchoarena, 2021). An improved Internet infrastructure with technology-enhanced learning has enabled new forms of lifelong learning involving online conferencing tools for a richer and more flexible study design (Williams, 2020). However, as described in Mozelius (2022), online conferencing requires a pedagogy and instructional redesign to support lifelong learning. This should preferably be built on a pedagogical model that considers the needs of professionals, such as experiential learning and work integration (Haddara and Skanes, 2007).

4. Research Context

The target course for this study is "Digitalisation and Digital Transformation in Organisations", which is part of a professional development project aimed at developing and offering flexible advanced-level courses for professionals. The courses within this project are offered as distance learning and run part-time to enable studies in combination with full-time work. The course for this study contains four modules and runs over 15 weeks, resulting in five ECTS credits, where one ECTS credit equals 28 hours of work. Each week includes a three-hour seminar. The target group for the actual course is professionals who want to develop their skills in digitalisation, digital transformation, data-driven organisations, and change management. The course participants work in public or private organisations and occupy roles such as project leader, manager, business developer, and IT strategist. With their different backgrounds and experiences with digitalisation, their course expectations vary, resulting in challenges to course design and learning activities. The actual course combines both synchronous and asynchronous learning activities, or either of them, with seminars once a week. The course includes four occasions for the participants to give written feedback during and after the course: a check-in before the course starts, a mid-term evaluation, an internal course evaluation, and a formal university-level evaluation.

The course has been offered three times, and the overall impression is that the participants are satisfied. During the course, course participants drop off as the course proceeds due to personal and work concerns. The drop-offs are primarily at the beginning of the course. Only a few course participants graduated during the first two courses and got the credits. From an academic point of view, this is problematic since the pass rate is one of academia's ways to count learning and a quality measure in the higher education system in Sweden. In addition, the allocation of funds partly depends on the number of graduating course participants. One revision requirement has, therefore, been to increase the number of professionals graduating.

5. Method

This study's method followed the five-step design science process outlined by Johannesson and Perjons (2014). This process includes the following five-step, which preferably should be conducted iteratively: 1) explicate the problem, 2) define the requirements, 3) design and develop the artefact, 4) demonstrate the artefact, and 5) evaluate the artefact (Johannesson and Perjons, 2014). In a more general sense, design science is a research approach that contributes by designing and implementing artefacts that address identified problems (Hevner et al., 2010; Johannesson and Perjons, 2014). Given the practical orientation of the artefact, the contribution to knowledge can be either more limited and specific (e.g., one instantiation) or more abstract (e.g., design theories) (Gregor and Hevner, 2013). Design principles belong to the latter and are considered prescriptive knowledge. A design principle aims to capture knowledge about creating other artefacts belonging to the same class, (Sein et al., 2011). It moves the knowledge contribution from the specific case to the generalisation. Design principles should be evaluated based on their reusability and utility in environment (Iivari, Rotvit Perlt Hansen and Haj-Bolouri, 2021).

5.1 Creation of Design Principles

Creating the design principles included an interactive process involving data analysis and design revisions related to the course, focusing on the various steps in DSR. The initial step in this creation process was based on the

data collection and analyses from the first *two courses*. The data collection then included 58 entries consisting of professional check-in presentations (n=19), internal mid-term course evaluations (n=11), internal course evaluations after course completion (n=10), formal university-level evaluations after course completion (n=7) and examination assignments (n=11). Not all 19 participants completed all tasks due to not finalising the first or second course. The empirical material was saved and analysed in Nvivo. The empirical material was inductively analysed following the main steps of thematic analysis (Braun & Clark, 2006). The initial coding was kept close to the data, identifying 70 codes reflecting course design issues, learning activities, course information, and instructions. Through a step-by-step analysis, patterns emerged, and the initial codes were clustered into seventeen more abstract sub-themes relating to the strengths and weaknesses of the course. Two researchers conducted the initial coding individually to decrease the risk of a biased analysis. The following steps were a joint coding procedure to reach a consensus. This part of the analysis included several discussions with the other researchers.

The course design was evaluated and revised according to the strengths and weaknesses based on the empirical material from the first two courses. The strengths related to discussions between the professionals to find contextual solutions, interesting guest lectures, and practical assignments. The weaknesses related to, e.g., the lack of updated course information, the mixed structure of the seminars between the modules, the professionals' difficulties in reading, understanding, and contextualising the articles, and few graduating professionals (Brodén et al., 2023). The strengths and weaknesses were discussed among the authors and agreed upon as revisions for the third course. Some revisions included the lecturers, such as using the same structure in the seminars and other course administration, such as updated formal course information.

The last round of analysis included the answers from the third course, including all 17 additional entries. The entries were as follows: check-in presentation (n=10), internal mid-term evaluation (n=5), internal course evaluation after completion (n=1), and formal university-level evaluations after course completion (n=2) and examination assignment (n=6). The entries were included in the previous analysis material from the two first courses, following the same pattern with strengths and weaknesses. Two authors independently conducted this analysis and then discussed the strengths and weaknesses. The number of strengths was then slightly increased, and the number of weaknesses decreased. The material from the third course followed the same pattern in content.

Two authors then formulated the five design principles based on their previous work with the empirical material in the first two courses, the additional material from the third course, and their teaching experiences. The 17 themes aligned with the different principles, forming their justification.

5.2 Ethical Considerations

The course participants were all informed about the study and willingly consented to using their materials. The study has received ethical approval from an advisor at Karlstad University (HS 2023/690). In line with the principles of pedagogical action research, the issues of dual roles inherent in the roles of teachers and researchers were addressed. As Nolen and Putten (2007) described, this challenge emphasises the complexities of role definition, ambiguity, and conflict when researchers are active members of the system under investigation. To mitigate these dual roles, the two researchers not affiliated with the course have discussed the findings and contributed to the article's writing.

6. Result and Discussion

Here, the results, including discussion, are presented, following this study's aim to provide the reader with DP for a higher education course for professionals to facilitate lifelong learning.

6.1 Design Principles

The artefacts designed here are DP in the form of guidelines (Kali, Levin-Peled and Dori, 2009). They emphasise that DP should be iterative in their development, formed by generalisable and replicable experiences from previous knowledge. Therefore, we present the experience behind parts of the DP and follow the discussion of Kali, Levin-Peled and Dori (2009) on how to form the DP on successful activities, revised over time. As presented in the method section, the revision has been ongoing in all courses, from the first to the third. The formation of DP is based on the participants' check-ins and course evaluation. The DP is presented on a general level in Table 1 and further explicated individually.

Table 1: Design Principles

Principle	Name	Objective
1	Professional Pathways	The new knowledge is directly linked to real-world applications.
2	Knowledge Evolution	Gradual integration of knowledge over time using the examination assignment and seminars.
3	Preparedness Protocol	Weekly sessions focusing on preparation and working with emerging concepts.
4	Collaborative Connections	Group discussions where professionals exchange experiences, ideas, and perspectives on emerging concepts.
5	Learning Fusion	Blended learning combines face-to-face seminars, films, and articles.

6.2 Professional Pathways

Objective: The new knowledge of digitalisation is directly linked to real-world applications. The professionals link the new knowledge to their context.

Professional Pathways aims to integrate new knowledge of digitalisation directly into real-world applications, emphasising the relevance of learning experiences to professionals' contexts.

As Kember, Ho and Hong (2008) highlighted, the significance of relevance in higher education resonates with professionals' expressed anticipation of acquiring new tools and insights into digitalisation. This anticipation and the relevance of new knowledge form the cornerstone of the Professional Pathways design principle.

Implementation of this principle spans various aspects of the course, including the check-in process, guest seminars, integrated exercises within examination assignments, and contextualisation of articles within both the course framework and professionals' contexts. An essential aspect of lifelong learning is the concept of Bring Your Own Device (BYOD), which, in the context of this course, could be reinterpreted as Bring Your Own Data (BYOD). Mozelius, Olofsson and Håkansson Lindqvist (2022) emphasise incorporating authentic, real-world problems and data from companies and organisations into course activities. This approach aligns with the pedagogical principles of self-determination and contextualised learning, offering opportunities for skill development and organisational enhancement.

Integrating workplace data enriches learning experiences and contributes to organisational development and the acquisition of practical skills relevant to the workplace. However, it is essential to balance academic theory and the practical application of knowledge in solving real-world problems, as mentioned by Mozelius, Olofsson and Håkansson Lindqvist (2022).

In summary, Professional Pathways endeavours to bridge the gap between theoretical knowledge and practical application, fostering meaningful learning experiences that resonate with professionals' real-world contexts and contribute to individual skill development and organisational advancement.

6.3 Knowledge Evolution

The objective of knowledge evolution is gradually integrating knowledge over time using seminars and examination assignments, in this case, the learning diary. The professionals expect the evolution of knowledge to inspire and contribute to their curiosity, as one respondent described it as "it [the course] started my thinking activity and contributed to my curiosity."

The goal for the professionals for this DP is to develop themselves regarding knowledge, competence, and personal development, focusing on their lifelong learning (Jaldemark, 2020). The division of lifelong learning into these three categories follows the patterns of Blaschke (2019), adding to the professional and personal aspects of lifelong learning. As such, the course must be relevant to the bigger societal picture and add to the personal learning goals.

One way to look upon personal development is that professionals should feel more confident in their work role; where one professional emphasised it: "It [the course] has given me stronger faith that I will succeed in my role as responsible for digital services" and another:" I have learned so incredibly much, never could have guessed that this could leave such a mark partly about digitalisation but also about leading in change and daring to question whether all change is good or valuable."

There are several ways to design for knowledge goals. Here, the authors have decided to keep teacher-led seminars within each module. The seminars are recorded, and the professionals can revisit new knowledge or

concepts from seminars to decrease the burden of keeping up with work and the course, as emphasised e.g. by Atchoarena (2021). Further, based on the first evaluation, the seminars should follow the same structure, including presentations, discussions, and work on the examination assignment. The presentation forms the base for the following discussion, where the professionals can discuss their professional practice and learn from each other (Mozelius and Humble, 2020). On an overall level, one could describe that as informal study groups.

One particular part of the knowledge evolution is the examination assignment. Often, the professionals do not need the credits, like younger students. Professionals are more interested in the evolution of their knowledge. Therefore, one-course revision was to use seminar time, focusing on the literature and supporting the writing of the examination assignment. The examination assignment should be inspirational and based on the seminars, discussions, and the professionals' work context, confirmed by one of the course professionals: "Appreciate the submission task design as it was inspiring to write the submission". Therefore, learning to write the examination assignment in detail is attractive, increasing the number of submissions. The results show an increasing number of professionals graduating, from 50% to 60 % in the third course. One participant emphasises the focus on the examination assignment: "The only thing I think I did wrong from the beginning is how I set up my learning diary, and that is because I want a document with models and reflections that I take with me as my toolbox, that is, after the course. That is how I started writing. It is not until now that I realised that it does not fit with what we want; it is not the same document I perceived from the beginning".

In summary, knowledge evolution is formed by scientific knowledge contributing to further knowledge for professionals as individuals and their organisations. The course content should consider the current domain knowledge that interests the participants and encourage them to increase it.

6.4 Preparedness Protocol

Objective: The information about the course and the course follows the same pattern, such as weekly sessions simultaneously. That will give the participants time to focus on preparation and working with emerging concepts.

The professionals describe it as hard to combine work and studies and often miss parts of the course due to work assignments. Therefore, to mark their calendars and prepare themselves, the course information on external channels, such as the universities' website, needs to be updated and correct, emphasised like this by one professional: "I would have made even more time in my calendar if I knew that there were so many individual assignments". Besides describing the dates and content of the course, the information should describe the expectations on the professionals. The interested professionals thereby get a better picture of their required effort. It is also in favour of having a long time between the acceptance and the course start to avoid clashes in their work calendar.

Parts of the course design differ from other higher education courses (Haddara and Skanes, 2007). One difference is that the seminars are held in one particular afternoon and digitally. The professionals can adjust their schedules accordingly and be at work during the seminars. Another design decision is that the course is divided into modules, where the professionals can adjust their schedules depending on their interests and favoured knowledge. The modules should have clarity and similarities, e.g., clear module instructions in the virtual learning environment and the same structure in the seminars, phrased by one professional: "All instructions have been clear, so that makes it easier." The exact structure could include presenting film clips beforehand and preparing discussion questions. In the actual seminar, the teacher can give a presentation followed by group discussions related to the articles, film, and presentation.

The virtual learning environment (VLE) is often new to professionals and could even be a phenomenon that did not exist when they were students. It is, therefore, essential to make a walk-through at one of the first seminars to make their studies more efficient. As expressed by one professional: "Once canvas [the VLE] 'landed' with me, it is a good tool that makes it easy to get a good overview". To make the studies flexible, all course material should be accessible from the course start, and the articles should be available, either as uploaded documents or links for open-access articles. It is also preferable that the recordings related to the articles are prepared beforehand.

In summary, the preparedness protocol should guide the administration and teachers in updating public information immediately. The course should be structured to ease the burden of working and studying simultaneously.

6.5 Collaborative Connections

Objective: Group discussions where professionals exchange experiences, ideas, and perspectives on emerging concepts.

Collaborative Connections fosters group discussions among professionals, facilitating the exchange of experiences, ideas, and perspectives on emerging concepts. The teacher sets and articulates expectations for professionals to learn from one another, recognising that high expectations can positively impact motivation (Rubie-Davies, 2006). Professionals joining the course hail from diverse work contexts, enriching discussions with varied perspectives and insights. The check-in highlighted the value of "exchanging experiences between different roles, industries, or sectors," reflecting professionals' interest in learning from peers. Group discussions, inquiries, reflections, and pre-reading seminar articles provide platforms for dialogue and mutual sharing.

Collaborative Connections is designed to stimulate discussions and occasionally introduce initial topics for exploration. As Jeno (2015) recommended, embracing challenging tasks encourages professional motivation and deeper engagement with complex topics.

Feedback received from the professionals underscores the value of seminars in providing opportunities for professionals to receive feedback on their thoughts. The design principle thrives on the expectation for discussion and sharing, fostering a conducive arena for interaction. Small group discussions with diverse professionals are preferred, fostering productive exchanges over the 12-week program.

As Jeno (2015) discuss, the group's sense of relatedness contributes to learning motivation. While discussions alone may not lead to learning, Collaborative Connections serves as a platform for collaborative discourse. The professionals are often provided with focus areas or topics to initiate discussions. However, concerns about insufficient participants for discussion, raised in evaluations, have yet to materialise as an issue.

In summary, Collaborative Connections cultivate an environment where professionals actively engage in dialogue, leveraging diverse perspectives to deepen understanding and enhance learning outcomes.

6.6 Learning Fusion

Objective: Blended learning combining face-to-face seminars, films, and articles.

Learning Fusion is a pedagogical approach integrating various learning modalities, including face-to-face seminars, films, and articles, to enhance the learning experience. Inspired by the principles of Blended Learning and the flipped classroom model (Van der Zwan and Afonso, 2019), Learning Fusion has received positive feedback from evaluations, with participants expressing appreciation for its effectiveness. Statements such as "It is easier to learn when we utilise film and articles" and "The combination of film, articles, and discussions was beneficial" reflect the success of this approach.

Moreover, the professionals have emphasised the importance of engaging in discussions with colleagues to explore the relevance of course content to their professional activities, fostering reflective practice and nuanced analyses. This highlights another dimension of Learning Fusion—bringing course concepts into one's professional context and integrating external perspectives into the learning process.

Active learning is an essential aspect of Learning Fusion; as described by Van der Zwan and Afonso (2019) in their principle of Collaborative connections. It involves preparation, discussion, and contextualisation of new concepts, contributing to long-term learning outcomes.

Learning Fusion is a convergence of technological opportunities, a supportive seminar environment, and peer-to-peer knowledge exchange (Mozelius and Humble, 2020; Humble and Mozelius, 2021). Coupled with the Preparedness protocol, this approach offers professionals flexibility in engaging with the course content, including access to recorded seminars for review or catching up on missed sessions. Participants have lauded the availability of recorded seminars, recognising its value in facilitating flexible learning: "I could watch the seminar afterwards."

In essence, Learning Fusion embodies an innovative and adaptable approach to professional development, leveraging diverse learning resources and technologies to optimise learning outcomes and accommodate the varied needs of professionals.

7. Conclusion

Due to the rapid technological development in today's work life, lifelong learning is becoming increasingly essential. What is new today, such as the digital transformation, has to be understood by professionals. Higher education needs to establish itself as an interesting actor, providing courses with high satisfaction ratings for professionals. Therefore, this study aimed to analyse, present, and discuss design principles (DP) for a professional development course in higher education. In this context, design principles are guidelines, forming the theoretical contribution for further knowledge development. The set of DP developed in this study is: professional pathways referring to new knowledge directly linked to real-world applications; knowledge evolution, meaning gradual integration of knowledge using seminars and examination assignments; preparedness protocol focusing on updated information and structured templates for the seminars; collaborative connection, including discussion where professionals exchange experiences; and the last principle, learning fusion, directs toward blended learning by combining face-to-face seminars and films.

Lecturers and other stakeholders can use the set of DPs in practice to design or revise new or existing professional development courses. Further, the DPs can form the foundation for a new course or be the evaluation factors related to an existing one. The revision can then include one or several DP, depending on the need for revision. Another usage is to add evaluation questions for the professionals, using their perspective on what is essential to change. One future avenue for research is to add measurement points to find what revisions affect professionals' satisfaction with the course. One limitation of the study is that the number of professionals could be higher, and one additional direction for further research can be to increase that number and understand the efficiency of each DP.

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