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Developing design principles for digital learning platforms for qualitative social research

A comparative study for the design phase in the context of a DBR study

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Abstract

Digital learning resources hold significant potential to facilitate teaching and learning of qualitative data collection and data analysis methods. The design principles, digital teaching methods and learning materials determine student learning success. This raises the question of which design principles should be applied to develop digital learning materials. The article presents a framework to identify design principles and problems in the design phase of a Design-Based Research approach. A qualitative content analysis was conducted against the background of educational and media science theories. The aim was to identify design principles, and difficulties in two online resources and to apply the findings when developing own digital teaching/learning resources. Opportunities and problems in the area of teaching qualitative social research are discussed. The recommendations for action present relevant design principles on how digital platforms, materials, and didactics in the field of qualitative social research can be designed to develop innovative digital solutions.

Keywords: Design principles; qualitative social research; self-regulated learning; teaching-learning platform; qualitative content analysis

Entwicklung von Gestaltungsprinzipien digitaler Lehr-Lernangebote zu qualitativer Sozialforschung

Eine vergleichende Studie als Grundlage für die Entwurfsphase im Rahmen einer DBR-Studie

Zusammenfassung

Digitale Lehr-Lernangebote bieten sich als Möglichkeit an, um Ansätze, Verfahren und Methoden der qualitativen Datenerhebung und Datenauswertung zu vermitteln. Dabei stellt sich die Frage, nach welchen Gestaltungsprinzipien die digitalen Lehr-Lernangebote zu entwickeln sind, damit sie einen Beitrag zu dem Lehr-Lernprozess leisten. Der Beitrag stellt eine Möglichkeit vor, um in der Entwurfsphase im Design-Based Research Gestaltungsprinzipien herzuleiten und potenziell auftretende Probleme zu identifizieren. Eine qualitative Inhaltsanalyse wurde unter anderem vor dem Hintergrund bildungs- und medienwissenschaftlicher Theorien vergleichend durchgeführt, um Gestaltungsprinzipien sowie Probleme bei zwei digitalen Angeboten zu identifizieren und für die

Entwicklung eigener digitale Lehr-Lernangebote im Bereich der qualitativen Sozialforschung herauszuarbeiten. Dies ermöglicht es, Chancen und Probleme digitaler Angebote im Bereich der Vermittlung qualitativer Sozialforschung zu beleuchten. Die Handlungsempfehlungen stellen relevante Gestaltungsprinzipien dar und machen darauf aufmerksam, wie digitale Angebote gestaltet werden können, um innovative digitale Lösungen angesichts bestehender Angebote zu entwickeln.

Schlüsselwörter: Design-Based Research; Gestaltungsprinzipien; qualitative Sozialforschung; Selbstlernangebot; Forschungskompetenz

1 Introduction

Design principles represent situated guidelines in Design-Based Research (DBR) on how to design teaching/learning resources to achieve selected teaching/learning objectives (DBRC, 2003). In the concept of DBR, the application and explication of design principles provide a framework for the scientific development and iterative improvement of educational practices.[1] Design principles are useful for systematically addressing didactic challenges in teaching by developing new, innovative teaching/learning resources. Therefore, it is necessary to know these challenges in teaching and learning. But how does one proceed to develop new, innovative teaching/learning resources without one's own experience with specific difficulties in the field?

Examples of freely available online teaching/learning resources in the field of qualitative social research can be used to identify and reflect on design principles and to discuss problems in the digital teaching of qualitative social research. There is a need for supplementary digital educational resources that can create free space for teaching and/or contribute to the independent acquisition of a research method. Since teachers in the field of qualitative social research require a lot of interaction with students, course constraints often limit dedicated time for practical application (Kanter & Mey, 2021), an insufficient teaching of qualitative research methods is the consequence. This leads to the fact that qualitative methodological knowledge will be taught in an overview-like manner, the acquisition of key qualifications and the development of a research habitus are only possible to a limited extent. Open-access online resources for qualitative social research can be used to critically assess design principles and foster discussions on the challenges in digitally facilitated qualitative social research instruction. So far, there are only a few digital teaching/learning resources to acquire a method of qualitative social research as a self-learning course or to integrate it as a digital resource for classroom teaching. That's why the question arises of how to design innovative digital teaching/learning resources against the background of existing resources and their problems.

The aim of the article is therefore,

a) to develop design principles for digital teaching/learning resources in the field of qualitative social research by considering educational and media science theories and drawing insights from existing digital teaching/learning resources on the internet and
b) to identify their problems in teaching qualitative social research.

The formulation of theoretically and empirically validated design principles provides a framework for the development of novel, digitally facilitated teaching and learning resources in qualitative social research.

First, in Chapter 2, the theoretical background of the importance of design principles in DBR is presented on the basis of media and educational science. This is followed in Chapter 3 by a description of the method for testing design principles and identifying problems in the digital teaching of qualitative social research. To investigate the scope of the impact on students, it is sensible to analyse two

1 On the topic of platform design, see also the article by Althoff et al. in this special issue.

differently designed platforms since a topic can be approached, communicated, and appropriated in various ways. The topic 'Qualitative Content Analysis' on the German e-learning resource of the Centre for Research Methods at Ruhr University Bochum (RUB) and the German encyclopaedia article on Wikipedia are used as examples to analyse the design. Both platforms were chosen because they can be considered as a first approach for students to learn and inform themselves about a research method. In the following Chapter 4, the results of the analysis are presented and summarised. The empirical analysis allows examining parts of the current field of digital resources in the area of qualitative social research, identifying problems in teaching qualitative social research methods digitally. In conclusion (Chapter 5), design principles for the development of new, innovative digital teaching/learning resources are formulated. Furthermore, the limitations of the present study are discussed.

2 Theoretical background and current research

According to van den Akker (1999), design principles can be formulated as empirically and theoretically based recommendations for the development of didactic interventions in a specific teaching/learning setting. In order to achieve certain teaching/learning objectives, they can relate to the design of an intervention and/or the design of a process. While design principles identify trends and suggest effective application under specific conditions, their implementation requires thoughtful interpretation and adaptation within the unique context of each learning environment (Euler, 2014).

Dilger and Euler (2017) point out that design principles are mutually formulated conceptually and analytically by science and practice, which have to be proven in the respective other field (Dilger & Euler, 2017). Through practical application and generalisation across contexts, they gain robustness and validity (Bakker, 2019).

Design principles come into effect in all DBR phases. In the initial phase of problem definition, the didactic problem is identified by researchers and practitioners alike. In the design phase, the design principles represent theoretically and empirically based recommendations for action in order to provide orientation for the design of an intervention for a concrete didactic problem and thus represent a first step in theoretical understanding. Based on a thorough literature review and research in the didactic field, design principles are initially identified to be used as prescriptive assumptions for the design of interventions. Here, existing examples, proven principles, and functioning models can be selected. These previously identified design principles are contextualised and applied in the design phase. The evaluation phase examines to what extent the intervention, such as the development of a digital platform, has achieved the intended objectives. Data (quantitative/qualitative) collected on the intervention, on students, or on the teaching/learning objectives are used for evaluation. This involves examining whether the design principles have proved effective during the intervention. In the reflection phase, the design principles are developed from the results of the evaluation phase. The aim is to formulate robust design principles (Reeves, 2006).

Throughout the DBR phases, the formulated design principles are increasingly substantiated and further consolidated in order to contribute the findings to the scientific discourse. Collenberg (2020) distinguishes that design assumptions are first formulated from existing design principles, and design principles are confirmed or rejected by empirical studies according to rule-based criteria of relevance and usability. The design assumptions are aggregated back into design principles by passing through the various phases of DBR (Collenberg, 2020).

2.1 Specifying the question

This article explores the design and didactic preparation of new digital teaching/learning resources for qualitative research methods, considering existing materials and their problems. We assume that these resources are on a digital platform that shapes the teaching process of qualitative social research.

Three dimensions must be considered when developing digital resources. These include the design of the teaching/learning materials, the platform, and the didactics. These three dimensions can be derived from the didactic design and the implementation of the content (Kerres, 2018; Reinmann, 2015), as explained in the following definitions.

Teaching/learning materials (first dimension) describe the resources and contents on a specific topic (Reinmann, 2015). They are made available on a digital platform and can be used by teachers and students. This raises the question of the design principles according to which these should be prepared and compiled in order to present qualitative social research with its specific characteristics.

Digital platforms (second dimension) serve as the foundation for the delivery and access to instructional materials through the learning management systems (LMS). This can be described as a web-based software application with functions for administration, communication, and cooperation of users (Ifenthaler, 2012). LMS can be used in different forms and modalities and can be customised in various ways. However, teaching/learning platforms are predominantly used asynchronously in terms of time and also involve an asymmetry between the different roles, which is problematic for qualitative social research in particular.

Didactics (third dimension) defines the relationship between teachers and learners, how the content is conveyed, and the platform is used so that the relevant topic can be learnt. Three components are relevant in didactics, namely teaching, activation, and support of students (Reinmann, 2015).

These three dimensions for the design of digital teaching and learning of qualitative social research complement and interpenetrate each other. Within the framework of Design-Based Research (DBR), this paper aims to investigate design principles for specific interventions. The use of the design principles considers the object of the intervention, its objective, and the context in which it will be implemented. This approach ensures well-grounded design decisions informed by both theoretical foundations and empirical evidence. In the following, we present relevant design principles based on scientific findings.

2.2 Design principles for teaching/learning materials

The understanding and comprehension of content can be improved through different forms of presentation. Using design principles for teaching/learning materials enables learners to reduce their cognitive load and to promote the understanding of content and acquisition of knowledge (Heinen & Heinicke, 2021). The following design principles can be justified with different theories of learning and are briefly outlined below.

The Cognitive Load Theory (Chandler & Sweller, 1991) states that the capacity of working memory is limited. The cognitive theory of multimedia learning (Mayer, 2005) posits that learners achieve deeper understanding when presented with information through both auditory and visual channels. The integrated model of text and picture comprehension (Schnotz, 2005) also explains that mental representations are generated by linking auditory and visual information. Cognitive, metacognitive, motivational, and volitional learning strategies are necessary to integrate new information into existing knowledge structures, which facilitate recognition and recall later (Friedrich & Mandl, 2006).

The *Segmenting Principle* means to structure content into sense sections and comprehensible blocks (Reinmann, 2015). Structuring information into meaningful units enhances the receptivity of content. It facilitates the development of mental representations, thus promoting the cumulative construction of knowledge (Zander et al., 2012). The term mental representation means to represent and remind of information in memory (Niegemann et al., 2008).

Multimedia integrates different media components to stimulate several sensory channels simultaneously (Hartmann, 2008). The *Multimedia Principle* states that learning with the combination of text and images is more effective than learning exclusively from text (Butcher, 2014). Images, unlike text, can be grasped as a whole (Rey, 2008), which can reduce cognitive load of learners (Sweller, 2005). The understanding and comprehension of content can be improved through different forms of presentation.

The *Spatial Contiguity Principle* indicates that related images and texts must be in close spatial proximity (Sweller, 2005). Temporal contiguity means that spoken explanations are presented at the same time as the associated images (Niegemann et al., 2008). A spatial or temporal separation can lead to attention being divided (split-attention effect), which negatively affects learning (Zander et al., 2012).

The *Coherence Principle* describes how images and text should be logically related, complement each other meaningfully, and lead to the formation of a coherent cognitive structure so that related information can be absorbed simultaneously (Niegemann et al., 2008). Different mental representations are generated depending on whether there is a similarity with the content or not. In addition, an image can awaken the need for further information, motivate, and support the emotional component of learning. However, enrichment with interesting material that has exclusively decorative or motivational functions should be avoided (Reinmann, 2015).

The *Modality Principle* assumes that simultaneous presentation of content through different sensory channels enhances learner comprehension. Combining different symbolic representations (audio and image) fosters the engagement of multiple sensory modalities (hearing and seeing) (Reinmann, 2015). Spoken text should be preferred to written text, especially with moving images, since listening requires constant attention compared to reading (Reinmann, 2015).

The *Redundancy Principle* emphasises avoiding unnecessary media combinations based on the target group and the level of knowledge. Although interesting material is motivating, it does not contribute to learning success if there is sufficient prior knowledge (Reinmann, 2015). The expertise reversal effect states that combinations of spoken and written words that promote learning are suitable for low levels of knowledge, but redundant information with a high level of knowledge can have a negative effect on acquisition, as the information is already self-explanatory (Niegemann et al., 2008).

The *Signalling Principle* refers to the highlighting of particular core aspects, which improves general clarity (van Gog, 2014). The attention is drawn to the core content, and the structure of the material is improved by using signposts. Text or image-based references, clear headings, or colour coding of essential information can act as a highlight. Easily understandable and distinguishable pictograms improve coherence as recurring elements (Heinen & Heinicke, 2021).

2.3 Design principles for digital platforms

The selected principles for the design of digital platforms relate to the consideration of different target groups and user experiences.

According to the concept of *Universal Design*, a digital resource should be used flexibly, without adaptation, and without additional technology by people with different abilities in different situations (United Nations, 2007). This makes it possible to reach and support all potential users regardless of their abilities, backgrounds, and limitations to avoid exclusion or stigmatisation (Walkowiak, 2019).

The *Universal Design for Learning* concept identifies three principles (Orkwis & McLane, 1998):

1. Multiple means of representation are different ways of presenting information so that learners can understand a subject more easily.
2. Multiple means of action and expression can be understood as freedom of choice in processing information and presenting learning outcomes.
3. Multiple means of engagement aim to offer different activities that arouse interest and favour dedication to the topic. By avoiding complexity, materials are self-explanatory and can be used without additional description (Walkowiak, 2019).

Digital accessibility in teaching/learning resources means easy findability, unrestricted availability, and usability for all (HFD, 2022). The Web Content Accessibility Guidelines (W3C, 2023) provide information on how content can be made more accessible for a larger group of users (e. g., customisable font sizes, high contrast for better readability, allowing screen readers, image descriptions, and accessible documents/videos). Generally, reducing barriers supports making content more under-

standable, allowing resources to be used regardless of knowledge, language ability, or current concentration. This supports learners with disabilities or non-native speakers in using digital teaching/learning resources.

Usability as a term means user-friendliness and describes the ease of use of software or websites (Beier & Gizycki, 2002), which relates to universal design. The scopes of usability can be understood as content design, page design, and site design. Content design refers to the preparation of the content. Page design pertains to the visual design of the page. Site design refers to the arrangement of pages as a whole (Gädke, 2011). Navigation within the page can be promoted with menus, table of contents, headings, and page layout. Good usability is characterised as simple and intuitive.[2]

2.4 Design principles for didactics

Didactical design principles provide orientation for the teaching and learning of a topic. To explain individual design principles, it is useful to reconstruct the *self-concept* of teachers who use the digital teaching/learning resource. The term self-concept describes how the actors understand themselves and their actions and, consequently, the other person and their actions (Schmidt, 2012). The consideration of teacher's self-concept makes it possible to reconstruct their role in the teaching process and which role and behavioural patterns they assign to potential learners.[3] A student-centred approach is central to didactical design. It determines whether learners are viewed as objects or subjects. Reconstructing one's own didactic concept can influence the design of the digital teaching/learning resource.

The concept of *Constructive Alignment* (Biggs, 1996) provides a didactic framework to structure learning in a meaningful way. The assessment should be aligned with the learning objectives and activities so that coherence between competencies such as learning outcomes, teaching/learning scenarios, and assessment is achieved (Wildt & Wildt, 2011).

Learning objectives should be based on prior knowledge and formulated in a competence-orientated manner by naming the achievable knowledge and skills and clearly stating the added value of dealing with the topic (Reinmann, 2015). Competence can be generally defined as the combination of knowledge, skills, and performance ability in coping with action requirements (Weinert, 2001). Learning objectives can be categorised into taxonomies of learning (Bloom, 1956) to build up knowledge structures successively.

Learning activities relate to the learning objectives and are aligned with the competencies to be acquired. Activities are labelled with operators in order to be able to work on a task according to the specifications that learners deal productively or reproductively with the relevant content. Learners are visibly active in (re)productive learning in contrast to passive, receptive absorption of content. Activities help to promote (inter)action and dialogue (Reinmann, 2015).

Assessment and Feedback on respective learning activities means that a knowledge check and (evaluative) feedback are given (Reinmann, 2015). In this way, students can understand their own competence acquisition and consequently fill gaps in knowledge through repetition. This is relevant in order to be able to learn independently. On the basis of feedback, students can better assess their learning successes and be better supported by teachers. Constructive feedback can also contribute to further improving the didactic design.

The term *interactivity* in the digital space refers to a reciprocal, reactive relationship between learners and the platform. The platform behaves as an interactive actor and takes on the human role of teacher (Niegemann et al., 2008). Interaction is created through reciprocal influence, in which both provide incentives. Different levels of interactivity, such as selecting content, interacting with the system, or communicating between users, can increase motivation and encourage further learning (Reinmann, 2015). Interactions can indicate gaps in knowledge or errors in thinking and can both control the learning process from outside and support self-regulation (Niegemann et al., 2008).

2 On the topic of generation of design principles, see also the article by Voß et al. in this special issue.
3 On the topic of conceptions of teaching, see also the articles by Gerber and by Rosendahl in this special issue.

Reviewing different types of knowledge is essential during the didactical preparation of content for the platform. Contextualised collection of data and a cluster of information can be prepared in different ways (Kerres, 2018). Knowledge as a cognitive framework can be described in three aspects: declarative, procedural, and conditional knowledge (Paris et al., 1983). Declarative knowledge describes a static knowledge of facts, concepts, or semantic relationships. It is a prerequisite to building procedural knowledge. In contrast, procedural knowledge is dynamic know-how about actions and refers to the skill and ability to perform a process in order to achieve a desired result (Schraw & Moshman, 1995). The conversion of declarative knowledge into procedural knowledge includes memorising facts and practicing know-how through application, which leads to summarising the performance into rules, associations, and conditions. Conditional knowledge combines both and requires understanding how, when, and why to use facts, strategies, and skills to solve concrete tasks (Schraw & Moshman, 1995; Veenman, 2015).

3 Methodical approach

In order to test the selected design principles and to identify challenges in the development of digital teaching/learning resources, a systematic comparison between two opposing cases is useful. A case contrast offers the opportunity to relate different digital solutions to each other and to gain an insight into the range of online resources and their problems. For this reason, both RUB's e-learning course and Wikipedia's article are analysed because the two sites differ in the preparation of content with regard to the three dimensions. RUB was selected because it appears to be an innovative digital self-learning course in the field of qualitative research methods. Wikipedia was chosen because it is a database where students quickly obtain knowledge.

Using the example of these two German 'Qualitative Content Analysis' pages, the design and preparation on RUB's e-learning site and on Wikipedia were analysed. The topic on both pages was kept constant in order to more clearly emphasise the difference in design principles.

The analysis of digital teaching/learning resources was carried out with a qualitative content analysis (Mayring, 1994), as it allows a systematic, rule-based, and quality criteria-orientated interpretation and systematisation of content (Stamann et al., 2016). Single words and/or elements on the respective page were considered as concrete units of analysis (Mayring, 2014), without going into external content. Multiple category assignments of units of analysis were possible.

The design principles can be understood as categories that can be developed both deductively from theory and inductively from the material.[4] The categories obtained have been collected, examined for relevance, systematised, and redundancies have been removed (Helfferich, 2011). The deductively and inductively identified categories were theoretically localised, concretised with definitions from the literature, and condensed. Building on this, the coding rules were then derived based on the characteristics with minimum and maximum values. These values per category can be identified and taken into account in the design of digital teaching/learning materials, but the intensity to which extent each principle is characterised depends on the intended use of the educational resource.

A category system has been developed from the categories obtained, which can be applied to three areas of a digital teaching/learning resource in particular in order to identify design principles: the design of teaching/learning materials, the design of platforms, and the design of didactics (Table 1).

In consideration of several run-throughs of the material and the involvement of two people for coding, the category system was tested for feasibility. An inter-coder reliability of 0.81 indicates an applicable, reliable category system that allows the categorisation of digital teaching/learning resources and thus the identification of design principles. The identification of design principles makes it possible to assess the extent to which recommendations for action have been implemented and

4 On the topic of generation of design principles, see also the article by Althoff et al. in this special issue.

which problems in teaching and learning still exist, but they are not explicit guidelines on how all teaching/learning resources should be designed.

Table 1: Coding guidelines within three dimensions

Categories	***Values and coding rules***	***Advantage***
Design principles for teaching/learning materials		
Content structuring	**Segmenting Principle:** If the material is structured in various sense sections and clearly arranged. **No Segmenting Principle:** If no clear structure and layout arrangement is given.	Learning capacity
Multimedia Principle	**Multimedia Principle:** If at least two different media or representations are available on the page. **No Multimedia Principle:** If only one media or sort of representation exists.	Understanding, Comprehension
Spatial Contiguity Principle	**Spatial Contiguity Principle:** If corresponding media or information are presented in close proximity, and thus, the attention is not split. **No Spatial Contiguity Principle:** If no spatial positioning is visible, the page must be left or materials are missing on a topic.	Reduction of cognitive effort
Coherence Principle	**Coherence Principle:** If multiple media are available and extraneous material deals thematically with the same content. **No Coherence Principle:** If media don't correspond thematically, only decorative images or supplemental materials exist.	Retentiveness
Modality Principle	**Modality Principle:** If several media address different senses (both the visual and the verbal channel). **No Modality Principle:** If different media are combined but address just one sense.	Content processing
Redundancy Principle	**Redundancy Principle:** If the superfluous combination of different media is left out. **No Redundancy Principle:** If superfluous information in different combinations of media is offered, which doesn't correspond to the level of knowledge in the target group.	Focus
Signaling Principle	**Signaling Principle:** If cues are added that guide the attention to relevant elements or relevant information is graphically highlighted. **Typographic marking:** If a design variation of font is used for simple highlighting text. **No Signaling:** If no modification of relevant information to provide better readability is done.	Structuring, focus
Design principles for digital platforms		
Universal Design for Learning	**Universally designed resource:** If the learning resource is flexibly accessible in different modes of presentation, it can be learnt and documented in different ways, and there are multiple offers that allow engaged learning. **No universally designed resource:** If the learning resource is not designed for different target groups.	Consideration of individual needs
Digital accessibility	**Accessibility:** If the learning resource is accessible, easy to find and can be used equally regardless of personal requirements and disabilities. **Missing accessibility:** If there are restrictions on the accessibility, findability and usability of digital services for different user groups.	Inclusion, facilitating access
Usability	**Easy usability:** If a page or platform is structured in a comprehensible way and the navigation has several control options.	Motivation, pleasure

(Continuing table 1)

Categories	*Values and coding rules*	*Advantage*
	Prerequisite usability: Navigation on a site is only possible with intensive instructions.	
Design principles for didactics		
Self-concept of the teacher	**Self-concept:** Describes one's own self and one's own actions in relation to others.	Didactical concept, view of learners
Constructive Alignment: Learning objectives	**Competence-orientated learning objectives:** If the learning objective to be acquired is stated concretely, is oriented towards competencies and is described using a taxonomy of learning. **Latent learning objectives:** If no concrete learning objectives are stated, these can be derived abstractly from the knowledge/skills that can potentially be acquired. **No Learning objectives:** If there is only a description of the content of the learning resource, no learning objectives emerge.	Relevance of learning
Constructive Alignment: Learning activities	**Learning activities for reproductive learning:** There are mainly opportunities for independent repetition and acquisition of the content taught. **Learning activities for productive learning:** If the tasks are designed for reflection, knowledge transformation and knowledge creation. **Receptive activities to receive content:** If the focus is on mediation rather than appropriation, the content is only offered without instructions on how to engage with it.	Acquiring knowledge
Constructive Alignment: Assessment and Feedback	**Assessment and Feedback for students:** If there is feedback on results or errors in a knowledge test or check on learning progress. **Assessment without Feedback for students:** If there is a knowledge test or a check on the learning status for students without providing any information on the quality of the learning success. **Feedback for teachers:** If conclusions can be drawn from the learning outcomes about the teaching process in order to improve teaching. **Feedback for students and teachers**: If both students and teachers receive feedback on tests. **No Feedback:** If there is no feedback at all.	Monitoring the state of knowledge
Interactivity	**Interactivity with the platform:** When there is a two-way active, reactive or communicative action between the platform and the user. **No Interactivity**: If the platform is used passively.	Motivation, support, guidance
Reviewing types of knowledge	**Teaching declarative knowledge:** If the focus is on facts and concepts, there are opportunities to acquire declarative knowledge. **Teaching procedural knowledge:** If the resource provides opportunities for the acquisition of practices, skills and abilities. **Teaching conditional knowledge:** If the resource gives methodological strategies for approaches to combine how, when and why to use knowledge to solve concrete tasks.	Reflection on the content

4 Results of the empirical analysis

4.1 E-Learning at Ruhr-University Bochum

The page 'Qualitative Content Analysis' on RUB's e-learning course is an open educational resource (OER) for acquiring basic methodological knowledge. According to RUB's *self-concept,* the e-learning resource enables independent learning as an interactive introduction. The thematic basics are developed on the respective page without any special prior knowledge. The brief presentation of qualitative content analysis on the site makes it possible to keep time for learning as compact as possible. Introductory and advanced topics are presented in parallel and are therefore aimed at different competence levels.

The implementation of the *Segmenting Principle* can be recognised by individual small blocks. Separate sense sections stand out clearly from one another and are subdivided into different topics. The *Multimedia Principle* has also been realised. Several pictures, a diagram, and two interactive videos are available for this purpose. In accordance with the *Spatial Contiguity Principle*, it can be seen that images and texts are positioned directly next to each other. The *Coherence Principle* is implemented, for example, in a diagram that illustrates the structure of category systems. This makes it easier to recognise and understand different forms (list, hierarchical structure, and network) graphically from the explanation in the text. *No Modality Principle* is recognisable, as the content (e. g., interactive videos) does not allow parallel aural and visual perception. There is also *no Redundancy Principle*, as evidenced by the fact that some images are only decorative and are not essential for understanding the content. Although they can increase motivation, they are a burden on cognitive effort because time is spent on the image and not on the content. The *Signalling Principle* is applied stringently. The headings are clearly marked and colour-coded (green, orange, and blue) to make it easier to provide structure. Some headings are formulated as questions so that they are also informative in nature. Pictograms, which are added to the menu, can be seen as an orientation aid.

The RUB's e-learning resource does *not represent a universally designed resource*, as although various forms of presentation convey the topic vividly and are simply prepared so that one can concentrate on it with little effort. In order for different groups (e. g., deaf, visually impaired) to be able to use the learning resource, there is a lack of multiple means of representation (e. g., podcasts, subtitles) and multiple means of learning engagement. *Missing Accessibility* means that the interactive elements restrict their use. With H5P elements like mouse-over effects or drop-down menus, some accessibility functions (e. g., screen reader) are not possible. The pictures are not accessible because of missing subtitles. Some formats are purely auditory or purely visually orientated and, therefore, cannot be edited with a corresponding sensory impairment. For e*asy usability* and ease of navigation, the website has clear menus. The start page provides a guided orientation for searching and finding, a search function, and a keyword search as a word cloud. If learners already know how to integrate the respective method within a research process, it is conceivable to follow the menu via 'Qualitative Analysis Methods'.

Constructive alignment is available in rudimentary form. The e-learning resource does *not contain any learning objectives* for qualitative content analysis; only the aim of the method in general. Predominantly *learning activities for reproductive learning*, such as explanations, examples of the research question, and opportunities for self-reflection, are offered, but these are not linked to further working assignments. An interactive video shows step-by-step examples of coding using Maxqda software. Various forms of *assessment and feedback for students* are available. Knowledge checks allow students to reflect on learning and compare it with sample solutions. The didactic question, therefore, remains open whether the topic has been understood by learners and can be carried out independently on one's own research question and analysing qualitative data. *Interactivity with the platform* is also visible. Click-through texts motivate reading and arouse curiosity, as a long text is divided into small chunks. An attempt is made to depict introductory and advanced topics through interactive control options of different levels of difficulty. The use of the term level instead of an educational term such as taxonomy indicates gamification, which represents a hedonistic form of learning (Schöbel & Söllner, 2019). Such playful functions represent a low degree of reactive interactivity to react to the learner's own needs. Due to the application-orientated preparation of content, *procedural knowledge* can be acquired. The content proceeds directly to methodological implementation, although it does not theoretically explain a particular procedural step, e. g., whether the definition of a category should be literature-based or what exactly is meant by an anchor example.

4.2 Encyclopedia article on Wikipedia

Wikipedia's *self-concept* is aimed at the participatory development of an encyclopaedia and a knowledge database in order to compile content according to current knowledge and make it available to the public. Wikipedia does not claim to be an educational platform, but it is often used as an initial

approach to a topic. Known factual knowledge is presented neutrally and without value judgement, without the creation of new knowledge or theory. The content tends to be reviewed by a collective network.

The *Segmenting Principle* is expressed by organising the content along the headings into four sections. The *Multimedia Principle* has been implemented, as a graphic and an audio file are available in addition to the text. The *Spatial Contiguity Principle* is that the graphic is being integrated into the right-hand margin of the respective paragraph. The *Coherence Principle* is only partially evident, as the methodological procedure is discussed not in the text but only in the graphic. The *Modality Principle* is present, as the wiki article can be both read and listened to. The *Redundancy Principle* has been implemented, as there are no superfluous links. Wikipedia only uses *Typographic Marking* in the form of two levels of headings. For better readability, sections under each heading are separated from one another by a horizontal line.

There is *no Universal Design for Learning*, as the content is limited to a summary that offers neither multiple means of presentation nor opportunities for dedicated engagement with the content. Nor can the results be documented and checked directly. Nevertheless, *accessibility* is provided through free availability on the internet without registration. Providing an audio file of the article assists people with visual impairments, low reading skills, or low literacy. Intuitiveness and *easy usability* can be recognised due to its lack of structural depth. The page can be accessed either via a search field or via a cross-reference from another article. When searching, suggested terms are added to a selection list. In cases of cross-references, a brief description of the article appears.

There is *no Constructive Alignment* on Wikipedia because there are *no Learning Objectives*, only *receptive activities to receive content,* and *no Feedback or Assessment* on the topic of qualitative content analysis. The wiki page does *not provide any interactivity* even with different layout interfaces. The site only conveys *declarative knowledge*. There are no obvious application references, indicating that the resource is not suitable for in-depth learning. No transfer can be achieved as the site remains superficial and does not address practical aspects of methodical conducting.

5 Conclusion

The comparative approach of analysing the RUB's e-learning resource and the encyclopaedia article on Wikipedia has proven to be productive. Examining these two diametrically opposed digital resources sensitivity to the range of different design options. This makes it possible to broaden the horizon and recognise current challenges in teaching and learning qualitative social research and, therefore, to test the presented category system.

The comparison shows that digital teaching/learning resources can be designed in different ways and that it is advisable to reflect the intended design of digital teaching/learning programmes in advance. The design principles presented (Table 1) serve as a working basis and provide a good starting point for systematically developing well-founded digital resources in the field of qualitative social research. The design principles are exemplary, though, and transferable to online resources for teaching and learning in other thematic and disciplinary fields.

The challenge in preparing digital teaching/learning resources is to enable a comprehensive introduction to a method of qualitative social research. The results show that real (inter)active engagements with the teaching/learning content in the observed field are missing. Regarding the design of respective resources, a lack of concrete ideas on how (re)productive tasks and exercises can be designed still exists. Constructive feedback on teaching/learning activities and learning progress is also not available for learners on any of the sites analysed. As a result, forming a research habitus seems to be difficult when using digital learning tools exclusively. Large parts of e-learning are confronted with these and other challenges (e. g., fully accessible and universally designed material, relevance to practical and professional application, and open access). At the same time, great potential is

apparent here, for which concepts such as Constructive Alignment ensure some suggestions.[5] Taking one's own self-concept into account, it is worthwhile to think about one's own objectives, as this implicitly expresses one's own didactic concept. The process of preparing and reviewing knowledge into appropriate materials helps to make different types of knowledge accessible. It is important to systematically consider which types of knowledge should be conveyed and how. Moreover, it makes sense to address both declarative knowledge and procedural knowledge and to combine them appropriately with conditional knowledge.

Critically, it should be noted that the present study has some limitations: Only two digital resources were reflected against the background of a variety of different design principles. The list of design principles is certainly not exhaustive, but it is necessary to identify further design principles for one's own comprehensive resource for learning and teaching qualitative research methods. Therefore, this analysis can only be regarded as a starting point with the aim of thinking further about digital teaching of qualitative social research.

An additional limitation of the study is that only digital resources were analysed without including the voices of potential users. This can, therefore, be formulated as a requirement for new studies to identify design principles by presenting the digital teaching/learning resource to teachers, students, or researchers to examine their user experiences so that appropriation processes become visible.[6] This would certainly reveal further challenges, needs, and potentials.

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References

Althoff, J., Barth, M. & Keller, J. (2025/in this special issue). On the generation of design principles in the DBR process. *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2453W

Bakker, A. (2019). Design principles in design research: A commentary. In A. Bikner-Ahsbahs & M. Peters (Eds.), *Unterrichtsentwicklung macht Schule* (pp. 177–192). Springer. https://doi.org/10.1007/978-3-658-20487-7_10

Beier, M. & Gizycki, V. (2002). *Usability*. Nutzerfreundliches Web-Design. Springer. https://doi.org/10.1007/978-3-642-56377-5

Biggs, J. (1996). Enhancing teaching through constructive alignment. *High Educ, 32*(3), 347–364. https://doi.org/10.1007/BF00138871

Bloom, B. S. (1956). Taxonomy of Educational Objectives. *Handbook: The Cognitive Domain*. David McKay.

Butcher, K. R. (2014). The Multimedia Principle. In E. R. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp. 174–205). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.010

Chandler, P. & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction, 8*(4), 293–332. https://doi.org/10.1207/s1532690xci0804_2

Collenberg, M. (2020). Entwicklung von Gestaltungsprinzipien zur Förderung interkultureller Lehrkompetenz, *EDeR, 4*(2). https://doi.org/10.15460/eder.4.2.1458

DBRC [The Design-Based Research Collective] (2003). Design-based research: An emerging paradigm for educational inquiry. *Educ Res, 32*(1), 5–8. https://doi.org/10.3102/0013189X032001005

Dilger, B. & Euler, D. (2017). Wissenschaft und Praxis in der gestaltungsorientierten Forschung – ziemlich beste Freunde? *bwp@*, 33, 1–18.

Euler, D. (2014). Design Principles als Kristallisationspunkt für Praxisgestaltung und wissenschaftliche Erkenntnisgewinnung. *Zeitschrift für Berufs- und Wirtschaftspädagogik Beiheft, 27,* 97–112.

5 On the topic of Constructive Alignment, see also the article by Schäfer et al. in this special issue.
6 On the topic of collaboration, see also the article by Scorna et al. in this special issue.

Euler, D. (2017). Design principles as bridge between scientific knowledge production and practice design. *EDeR, 1*(1). http://doi.org/10.15460/eder.1.1.1024

Friedrich, H. F. & Mandl, H. (2006). Lernstrategien: Zur Strukturierung des Forschungsfeldes. In H. Mandl & H. F. Friedrich (Eds.), *Handbuch Lernstrategien* (pp. 1–23). Hogrefe.

Gädke, D. (2011). *Usability-Analyse der eLearning-Plattform Moodle*: Integration in die persönliche Lernumgebung. VDM.

Gerber, L. (2025/in this special issue). Understanding ideas about self-study metaphorically? *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2447W

Hartmann, F. (2008). *Multimedia*. utb.

Heinen, R. & Heinicke, S. (2021). Gestaltung von Lernmaterial und Didaktische Typografie – wie sich die Lesbarkeit von Texten auch ohne sprachliche Anpassungen verändern lässt. In *PhyDid B – Didaktik der Physik – Beiträge zur DPG-Frühjahrstagung, 1,* 395–402. http://phydid.physik.fu-berlin.de/index.php/phydid-b/article/view/1182

Helfferich, C. (2009). *Die Qualität qualitativer Daten*. Manual für die Durchführung qualitativer Interviews. Springer. https://doi.org/10.1007/978-3-531-91858-7

Hochschulforum Digitalisierung (Ed.) (2022). *Leitfaden zur Digitalen Barrierefreiheit im Hochschulkontext*, no. 66.

Ifenthaler, D. (2012). Learning Management System. In. N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning* (pp. 1925–1927). Springer. https://doi.org/10.1007/978-1-4419-1428-6_187

Kanter, H. & Mey, G. (2021). Herausforderungen, qualitative Forschungsmethoden zu lehren/lernen. In A. M. Kunz, G. Mey, J. Raab & F. Albrecht (Eds.), *Qualitativ Forschen als Schlüsselqualifikation* (pp. 26–51). Beltz.

Kerres, M. (2018). *Mediendidaktik*. Konzeption und Entwicklung digitaler Lernangebote. De Gruyter.

Mayer, R. E. (2005). Cognitive theory of multimedia learning. In R. Mayer (Ed.), The *Cambridge Handbook of Multimedia Learning* (pp. 31–48). Cambridge University Press. https://doi.org/10.1017/CBO9780511816819.004

Mayring, P. (1994). Qualitative Inhaltsanalyse. In A. Boehm, A. Mengel & T. Muhr (Eds.), *Texte verstehen*: Konzepte, Methoden, Werkzeuge (pp. 159–175). UVK. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-14565

Mayring, P. (2014). *Qualitative content analysis: theoretical foundation, basic procedures and software solution*. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-395173

Niegemann, H. M., Domagk, S., Hessel, S., Hein, A., Hupfer, M. & Zobel, A. (2008). *Kompendium multimediales Lernen*. Springer. https://doi.org/10.1007/978-3-540-37226-4

Orkwis, R. & McLane, K. (1998). *A Curriculum Every Student Can Use*: Design Principles for Student Access. ERIC/OSEP Topical Brief.

Paris, S. G., Lipson, M. Y. & Wixson, K. K. (1983). Becoming a strategic reader. *Contemp Educ Psychol, 8*(3), 293–316. https://doi.org/10.1016/0361-476X(83)90018-8

Reeves, T. C. (2006). Design research from a technology perspective. In J. van den Akker, K. Gravemeijer, S. McKenne & N. Nieveen (Eds.), *Educ Design Res* (pp. 52–66). Routledge.

Reinmann, G. (2015). *Studientext Didaktisches Design*. Univ Hamburg.

Rey, G. D. (2008). *Lernen mit Multimedia*: Die Gestaltung interaktiver Animationen. Diss Univ Trier.

Rosendahl, N. (2025/in this special issue). Designing a teaching-learning laboratory using Design-Based Research. *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2446W

RUB (February 24, 2023). *Qualitative Inhaltsanalyse*. https://methodenzentrum.ruhr-uni-bochum.de/e-learning/qualitative-auswertungsmethoden/qualitative-inhaltsanalyse/

Schäfer, J., Donner, R. V., Ioffe, O. B., Judakova, G. & Hajji, R. (2025/in this special issue). Digital learning materials and students' examination performance in engineering mathematics. *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2449W

Schmidt, F. (2012). *Implizite Logiken des pädagogischen Blickes*. Eine rekonstruktive Studie über Wahrnehmung im Kontext der Wohnungslosenhilfe. Springer. https://doi.org/10.1007/978-3-531-18752-5

Schnotz, W. (2005). An integrated model of text and picture comprehension. In R. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp. 49–70). Cambridge University Press. https://doi.org/10.1017/CBO9780511816819.005

Schöbel, S. & Söllner, M. (2019). Leitfaden für die Identifikation, Auswahl und Kombination von Gamification-Elementen am Beispiel des Lernkontextes. In J. M. Leimeister & K. David (Eds.), *Chancen und Herausforderungen des digitalen Lernens*. Springer.

Schraw, G. & Moshman, D. (1995). Metacognitive theories. *Educ Psychol Rev, 7*(4), 351–371. https://doi.org/10.1007/BF02212307
Scorna, U., Domine, I., Schäfer, J., Voß, G. & Hajji, H. (2025/in this special issue). Multidisciplinarity, Interdisciplinarity and Transdisciplinarity. *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2455W
Stamann, C., Janssen, M. & Schreier, M. (2016). Qualitative Inhaltsanalyse – Versuch einer Begriffsbestimmung und Systematisierung, *FQS, 17*(3). https://doi.org/10.17169/fqs-17.3.2581
Sweller, J. (1988). Cognitive Load During Problem Solving: Effects on Learning. *Cognitive Science, 12*(2), 257–285. https://doi.org/10.1207/s15516709cog1202_4
United Nations (2007). The Convention on the Rights of Persons with Disabilities. https://www.ohchr.org/sites/default/files/Ch_IV_15.pdf
van den Akker, J. (1999). Principles and Methods of Development Research. In J. van den Akker, R. M. Branch, K. Gustafson, N. Nieveen & T. Plomp (Eds.), *Design Approaches and Tools in Education and Training*. https://doi.org/10.1007/978-94-011-4255-7_1
van Gog, T. (2014). The Signaling (or Cueing) Principles in Multimedia Learning. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp. 263–278). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.014
Veenman, M. V. J. (2016). Metacognition. In P. Afflerbach (Ed.), *Handbook of individual differences in reading* (pp. 26–40). Routledge.
Voß, G., Bönninger, Y., Mählitz-Galler, E., Merkle, A. F., Wagnerberger, D., von Velsen-Zerweck, B. & Herzog, M. A. (2025/in this special issue). Knowledge transfer and cooperation between university and practice. *die hochschullehre*, 11/2025. https://doi.org/10.3278/HSL2444W
Walkowiak, M. (2019). Konzeption und Evaluation von universell designten Lernumgebungen und Assessments zur Förderung und Erfassung von Nature of Science Konzepten. Diss Univ Hannover.
W3C (2023, September 21). *Web Content Accessibility Guidelines (WCAG) 2.1*. https://www.w3.org/TR/WCAG21/
Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen & L. H. Salganik (Eds.), *Defining and selecting key competencies* (pp. 45–65). Hogrefe.
Wikipedia (February 24, 2023). *Qualitative Inhaltsanalyse*. https://de.wikipedia.org/wiki/Qualitative_Inhaltsanalyse
Wildt, J. & Wildt, B. (2011). Lernprozessorientiertes Prüfen im „Constructive Alignment". Ein Beitrag zur Förderung der Qualität von Hochschulbildung durch eine Weiterentwicklung des Prüfungssystems. In B. Berendt, H. P. Voss & J. Wildt (Eds.), *Neues Handbuch Hochschullehre*.
Zander, S., Hawlitschek, A., Seufert, T., Brünken, R. & Leutner, D. (2012). *Psychologische Grundlagen des Lernens mit neuen Medien*. Univ Rostock.

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