

Criteria for Designing Blended Learning Materials for Inclusive Education: Perspectives of Teachers and Producers

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Abstract. Inclusion and learning with media are both global megatrends in 21st century education and both are stimulating profound changes for educational institutions. While there is consensus that media education offers special opportunities for inclusive classrooms, most of the blended learning platforms currently on offer are not accessible to and thus not usable for students with special needs. It is a challenge for both teachers and producers of media based learning materials to meet the needs of all students. The purpose of the exploratory study presented here was to collect qualitative data on the didactical requirements for inclusive learning materials from the perspectives of teachers and producers. The subject of the study was “Planet School”, the most important blended learning platform available for schools in Germany. To include the perspectives of experienced teachers the first research module had a focus on their practical experiences in inclusive classrooms. Based on participatory observation and interviews it was possible to develop recommendations for the design of blended learning materials for inclusive education. The second module focused on the perspectives of the producers. Based on the results of module one the responsible public broadcaster developed criteria for the design of materials, modules, and activities for inclusive education. This article compares the different perspectives. This procedure will lead to the development of a blended learning platform that addresses the needs of different types of learners and offers accessible and usable materials including movies, television broadcasts, and interactive and multimedia content for students with different prerequisites for learning.

Keywords: E-inclusion · Blended learning · Broadcasters · Inclusive education · Inclusive multimedia learning materials

1 Introduction

The increased focus on inclusive education can be largely explained by the ratification of the UN Convention on the Rights of Persons with Disabilities (UN-CRPD). More than 150 countries had signed the contract as of 2014. They include almost all American nations, all European nations including the European Union, almost all Asian and African nations, Australia, and New Zealand. The contract describes high expectations to shape the process of inclusion by providing for appropriate representations of

disability in the media as well as by using the media itself. Recent practical examples show how the combination of the global megatrends of media education and inclusive education create innovative approaches and that both trends can profit from each other [10, 18].

Before describing how to design digital learning materials for inclusive education, it is necessary to clarify the term ‘inclusion’. UNESCO defines the term in the policy guidelines for inclusion in education as follows:

“Inclusion is thus seen as a process of addressing and responding to the diversity of needs of all children, youth and adults through increasing participation in learning, cultures and communities, and reducing and eliminating exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, with a common vision that covers all children of the appropriate age range and a conviction that it is the responsibility of the regular system to educate all children” [20].

“A key characteristic of 21st century education is that classrooms are more diverse than ever. [8] Students have very different needs due to their social and cultural backgrounds, their language backgrounds, and their physical and intellectual abilities. The central question with a focus on the use of learning materials and ICTs is:

“Do materials cater to the needs of all learners with learning difficulties”? [20].

UNESCO stresses the importance of the adequate design of learning materials. Education through the inclusion lens implies “Flexible teaching and learning methods adapted to different needs and learning styles. (...) Flexible teaching methods with innovative approaches to teaching aids, and equipment as well as the use of ICTs.” [20].

Learning platforms can represent an essential aid for the individualization of ICT based learning materials and learning processes. One well known producer of web-based learning materials for schools in Germany is the public broadcasting station “Westdeutscher Rundfunk” (WDR). The WDR belongs to the ARD, a joint television network of nine state broadcasting organizations. It is the world’s second largest public broadcaster after the BBC. The mission of all public sector broadcast networks is to speak to all groups of society, providing them with information, education, and entertainment as well as with innovative and alternative programmes, especially for minority groups. One of these is “Planet School” (www.planet-schule.de). Television broadcasts and movies can be downloaded and watched in real-time. Detailed information, worksheets for creative lessons, and multimedia (e.g. educational games) can be found in these “Knowledge Pools” also. The content of the different media complement each other. “The website is currently only available in German. Many schools already use the platform for a wide range of subjects. The platform however is not specifically designed for students with special needs” [6]. The purpose of this study was to find out how this platform can become appropriate for inclusive education and which design criteria for creating web-based learning materials are the most appropriate.

2 Research Design

The aim of this study was to show how to meet the challenges of creating media for inclusive learning. The main research questions were:

1. What distinguishes good inclusive digital learning materials?
2. Which quality criteria can be established?

Additional aims were to enable students to deal independently with media and to encourage cooperative learning. It was of key importance to link the perspectives of teachers and producers. The interpretative approach consists of three modules of qualitative research. These are outlined below (Fig. 1).

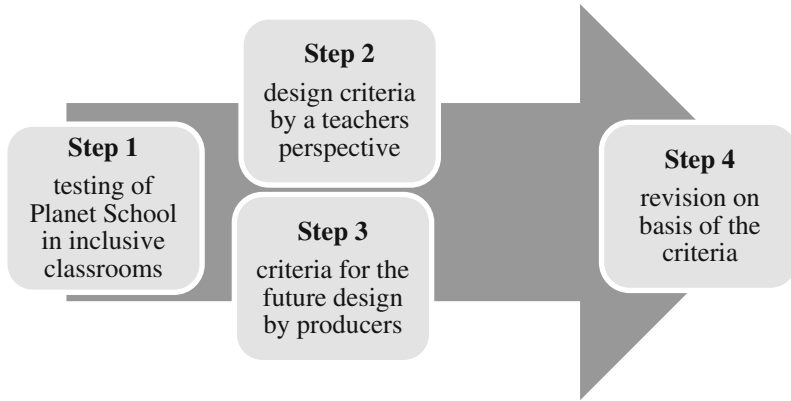


Fig. 1. Research design

Step 1 (Dortmund University): Testing of Planet School in Inclusive Classrooms

Analysis of international research shows seven essential factors for the creation of learning materials for inclusive education. The multi-method research design consists of participatory observation and semi-structured interviews with teachers. The main focus was on the practical experiences with the learning materials provided by “Planet School”. Specifically, 11 experienced teachers at primary and secondary schools worked with different topics covered by “Planet School” in 2013 and 2014. The five schools belong to diverse German school districts and were randomly selected. All teachers had a wide range of students in their classroom. This included students with learning, intellectual, physical, emotional, and behavioural disorders. This also included students with dyslexia, dyscalculia, and special needs in language and communication. The sample contained 108 students. Twenty-six of them had special needs concerning learning and communication, as well as special social, emotional, and motoric development needs. A preliminary study ensured the quality of the interview guidance and the participatory observation.

Step 2 (Dortmund University): Design Criteria from the Perspective of Teachers

The interviews with the teachers were analysed to form guidelines for the revision of the website. The first step was to transcribe the audio recordings of the interviews

in full. Step two was to work on a summarizing content analysis with MAXQDA. The results were evaluated on the basis of core categories based on the desk research to create the interview guidelines. Finally, all interviews were summarised by core categories and interpreted in combination with the results of the participatory observation. This procedure led to scientifically sound guidelines for the revision of the website. The revisions were discussed with a focus group of television professionals from the editorial board for educational programmes.

Step 3 (WDR): Criteria for Future Design by Producers

The results of the study stimulated an intensive process at the public broadcaster WDR concerning how to put the findings into practice. Beside technical questions about accessibility and usability, discussions about the copyright of the worksheets were of high importance. The process resulted in the development of criteria for producers of WDR schools TV and for media agencies that create inclusive learning content for the broadcaster. These criteria are the foundation for revising parts of the website, especially for the production of new content.

Step 4 (WDR): Revision on Basis of the Criteria

The developed criteria will lead to a revision of the platform “Planet School” with respect to the needs of inclusive instruction. Finally, each topic covered in “Planet School” is to be revised one-by-one. The recommendations will be especially important for new productions. Beside the novelties for the website itself, it is necessary to include the new findings into teacher training that is offered by the public broadcaster to promote the use of “Planet School” in classrooms.

3 Results

The results of each of the steps are presented separately. The final results presented here are the criteria for the production of blended learning materials for inclusive classrooms, because the last step, the revision of the website is work in progress.

3.1 Desk Research: Basic Principles for Blended Learning Materials

The importance of the design of digital media for the learning success of students, especially of students with special educational needs, is often discussed among teachers and the scientific community [10]. Although there is little data, the following basic principles can be established by analysing the international research. The desk-based research identified seven factors that are essential for the creation of inclusive learning content with digital media. These include:

1. Text and language
2. Individualisation and personalisation
3. Same learning subjects

4. Respect for the complexity of lived-realities
5. Cooperative/collaborative learning
6. Activity-oriented instruction
7. Web accessibility and universal design

Text and Language. “Traditional textbooks can be difficult for print impaired learners to access” [14]. Web-based texts can also be difficult for print impaired learners to access. While offering content in a variety of modifiable media platforms is an important element of inclusive media didactics, the research shows that text and speech themselves are great barriers for students with learning difficulties. Accessibility does not only refer to the accessibility and usability of learning materials in a technical respect, but it also refers to language-related accessibility.

The language of instruction predominantly used in schools is still that of the middle classes. This often constitutes a barrier for students with learning difficulties. Similarly, the monolingual custom represents a barrier for young persons from migrant backgrounds. “All learning materials and media (e.g. textbooks, worksheets, and film documents) ... should be critically examined with regard to their language related accessibility” [21].

However, alternatives should be offered. It should be considered that “... the needs of the large group of persons with learning difficulties ... differ in terms of written texts. The discussion about inclusion in the modern foreign language classrooms provides helpful results as well. When creating web content, “easy to read on the web” is essential for users with intellectual disabilities [14].

Individualization and Personalization. “Not every student has to achieve the same level!” [4]. The same learning outcomes apply to all students. However, these may be achieved at different times, in different methodological ways, with different forms of support from teachers, and with different learning materials. Individualized learning processes will address different types of learners and offer accessible and usable materials, including movies, television broadcasts, interactive, and multimedia content for students with different prerequisites for learning. Personalized learning enables students to achieve suitable educational qualifications and individual learning at the same time. The general education learning content in schools is expanded, decreased, or modified according to special educational needs. In addition to selection and modification, the design of teaching methods also arises from the individual learning prerequisites. “Inclusive teaching enables both: goal-differentiated and content-differentiated learning” [22]. Different learning materials have to be offered for five different levels, reaching from learning difficulties to special interests and giftedness. It is preventive because it counts on early interventions in cases of emerging learning disabilities and it is curriculum-based in that it is geared towards the methods and contents of classroom instruction [22].

Same Learning Subjects. Although working on the same subject represents the didactic core of inclusive learning [3]. In inclusive learning, it is also important to lead all students

towards the highest possible curriculum goals. This optimal support of all students is best achieved through joint and cooperative working on the same subject. This subject is determined by the students themselves, is derived from the general curriculum, and is offered in a differentiated way accordingly [9]. In the Index for Inclusion, the well-known tool for quality assurance in inclusive schools, this point is highlighted by the following question:

“Does teaching assume a shared experience that can be developed in different ways?” [13].

It is important to design learning methods in such a way as to enable students to discover for themselves what the “crux of the matter” is. The relationship between commonality and difference can therefore not be described on the basis of vertical levels from simple to complex. In planning, the issue revolves around the question of possible similarities among the students’ approaches [17].

Respect of Lived-Realities. The individuality of students, including their diverse experiences outside of school, represents the starting point for education. School itself is a living space for growing ups. In the Index for Inclusion, this point is addressed by the following question:

“Do the teaching materials comply with the backgrounds, experiences and interests of the students?” [13].

Social orientation is made available for adults through lived-realities as well as through the media. The media also shapes identity construction and self-assurance in adolescents. In order to do justice to the different heterogeneity dimensions of inclusive didactics, images, texts, and films should be selected in a way as to enable individual diversity to be recognized. The issue of disability has moved into the mainstream during the past few years due to its more frequent depiction in the media and it is now perceived more clearly by the population. In inclusive education, films on the topic of disability can raise awareness among all students. However, in the sense of disability mainstreaming, disability should not always be highlighted explicitly. Instead, persons with disabilities should simply belong to all contexts. This is a topic just like any other, which is part of the lives of students.

Cooperative and Collaborative Learning. The Index for Inclusion tries to make clear that collective learning includes both cooperative as well as individual learning forms [5, 13].

In connection with cooperative learning, a helper system is referenced. For school-work in collective learning, there is a wide range of helpers to choose from. These include partner classes or students, parents, colleagues and special needs educators. However, cooperative learning means much more than establishing a helper system. It refers to the voluntary collective bundling of individual experiences, knowledge, responsibilities, and group activities towards a common goal. Cooperative learning is a form of interaction with a common goal in which knowledge and skills are acquired together through exchange [18]. Ideally, all group members participate equally and take over joint responsibility. Non-disabled students can thus practise their social skills without falling behind in their subject-related academic performance [22]. Good

teaching is well-organized, clearly structured teaching with a high task-related activity level and intensive use of learning time on the part of the students. In addition, good teaching uses diverse methods and includes cooperative as well as individual learning phases [11]. Cooperative learning is intended to result in students supporting each other mutually to achieve results together. Cooperative learning is organized in the classroom whereas collaborative learning involves the whole school and additional partners. Collaboration is one of the successful factors that favor the inclusion of parents/guardians in the classroom and within the teaching team [2].

Activity-Oriented Instruction. Activity-oriented instruction is closely linked to cooperative learning. This student-oriented approach, developed from practical experience, is considered an alternative to traditional receptive teaching [1] or iconic and verbal-analytical acquisition processes. An understanding of environment and reality arises through an active dealing with reality because the idea of the origin of phenomena also determines the understanding thereof [12]. With action-oriented methods and practical approaches it is possible to create an “inclusive combination. This also includes product-orientation. Furthermore, students learn solidarity through goal-oriented work and to communicate and interact with others.

Web-Accessibility and Universal Design. “The convention on the rights of persons with disabilities (Articles 20 and 23), as well as the “Index for Inclusion” [5] call for accessibility. In the context of inclusion it is indispensable to implement suitable measures for accessible information and communication [22]. Aside from accessibility, universal design is a core principle for designing blended learning materials for inclusive education. The UN-CRPD addresses this issue in “Products, Environments, Programme and Services” [19]. Universal design is not only of importance for people with disabilities, but would benefit all citizens [14]. For example, the use of subtitles in films is useful for persons with hearing impairments as well as for migrants.

3.2 Perspectives of Teachers: Guidelines for Designing Blended Learning Materials

The aim of this module was to collect qualitative data on the didactical requirements for inclusive education from the perspective of teachers (for special and for mainstream education). The structuring of the individual interviews forms the basis for the systematic interview comparison. Finally, the results of the individual assessments are examined in context to core categories and are summarized in a table. By using this method we can make cross-case statements in which the specifics of the respective individual interviews are still explicitly considered. The overview shows the most frequently quoted statements (Fig. 2):

Code	Number of Codes	Percentage of all Codes
General learning arrangements	36	22%
Text and language	32	19%
Individualization and personalization	27	16%
Good presence of lived-realities	16	10%
Cooperative and collaborative learning	10	6 %
Activity oriented learning	10	6%
Accessibility	5	3%

Fig. 2. Most frequent codes

“The results of the summarizing content analysis underline the relative satisfaction of teachers with the usability of “Planet School” for inclusive classrooms. In general the teachers thought that “Planet School” is appealing to children and that “Planet School” is easy for children to understand” [6]. The teachers greatly appreciate the possibility of being able to exert direct influence across the revision. The systematic comparison of the individual interviews was made along the described core categories for the design of digital media for inclusive education.

Most of the remarks about the website concerned the general learning arrangements, an aspect that didn’t play an important role in the desk-based research. The most common statement in this core category concerned the worksheets. The teachers stated that they would like to work with Word documents that they can adapt to the individual needs of their students, or at least work with barrier-free PDFs. The teachers also expressed a request for more clearly structured worksheets. In their opinion, the design should be simpler and exclude logos and captions or any visual clutter that is not absolutely necessary. One recurring opinion was that the materials should be kept simple, especially since the overwhelming number of elements can confuse the students. There is a strong wish to install a forum to share self-created materials.

Furthermore, the didactical instructions should be categorized in terms of activity-oriented learning, game, worksheet, etc. The teachers would generally like to see a greater variety of methods available for use within one lesson. Practical examples, exercises, and interdisciplinary ideas are required. Didactical instructions for teachers and working tasks for students on every worksheet are indispensable. The didactical instructions should be categorized in terms of activity-oriented learning, game, worksheet, etc. All-in-all “Planet School” promotes very receptive learning. There is a strong demand for more activeness including partner and group work.

From the teacher’s point of view text and language are of high importance. The font type selected for the platform thus has to be a sans serif font such as Arial or Helvetica. It should also be possible to choose different fonts and font sizes. The platform should moreover offer short text with activity-oriented tasks for weak readers and alternative texts for strong readers. For complex topics like politics or history it would be helpful to have a version using simple language. Most of the students with special needs have learning difficulties. Thus, if writing is the main aspect, alternative tasks such as playful or physical exercises should also be offered.

The third most frequent quoted statements were about the individualization and personalization. The teachers identified a strong for different levels of learning concerning complexity, timeframe, and speed. There seems to be a need for the different levels to be labeled more clearly. Some of the expressions currently used (for all, for experts, for professionals) have stigmatizing effects. Neutral terms or the use of different colors would be more appropriate.

Design of Inclusive Blended Learning Materials. These recommendations were discussed in a focus group with television professionals who work at the editorial board for educational programmes. As such, a process of fundamental revision of the offer was initiated. This is still continuing. Since the WDR often has a large number of people involved in the design of materials, criteria (guidelines and checklists) was created for the design of inclusive learning and teaching materials specific to the different types of media. The checklists for the design of films and multimedia applications are presented below. They describe the individual measures in detail. These tools provide quality assurance.

3.2.1 Checklist Film¹

“Content-Related Design

- concentration on the essentials, no distracting elements
- clear explanations
- motivating background story
- reference to the real world
- clear character constellations and plots
- make persons with disabilities visible without clichés

Formal Design

- Essentials, no distracting elements: limit to one or two levels of action
- simple, understandable language
- no divergence of words and images
- short, precise voice-over texts
- calm imagery, no fast cuts
- no clip-like cuts when conveying content; calm camera movements
- structure films into meaningful units and chapters

Post-Processing

- sub-titles for persons with impaired hearing
- audio descriptions for blind and visually-impaired persons

3.2.2 Checklist Multimedia²

Design of Content

- Universal Design: diverse forms of presentation, e.g. texts, images, audios
- motivating elements (e.g. incentives, rewards)

¹ Copyright: Westdeutscher Rundfunk (WDR) Planet Schule 2014.

² Copyright: Westdeutscher Rundfunk (WDR) Planet Schule 2014.

- content-related assistance (such as aids that are always indicated)
- understandable language
- short, simple texts
- make persons with disabilities visible without clichés
- offer different levels of difficulty

Formal Design

- clear, simple symbols
- essentials: avoid elements that have no content-related function
- colour must not carry any meaning
- clear contrasts
- no automatically blinking, moving or scrolling elements
- easily readable, scalable writing

Operability

- simple, intuitive operability (no lengthy instructions necessary)
- no need to work out all informational elements and not in a prescribed order

Accessibility

- Compliance with WCAG 2.0 (Level AA)

Technical Functions

(...)” (WDR 2014, no page).

4 Conclusion

The megatrends of mediatisation and inclusive education can compliment each other. Seven decisive factors were identified from the analysis of the state of research on the design of inclusive blended learning materials. In guided interviews with teachers who worked with the website “Planet School” in inclusive classrooms, it became clear what concrete optimization requirements are necessary from their perspectives. From the analysis and interpretation of the interviews specific recommendations for the revision of media and materials became evident. The group discussion with producers initiated a process that ultimately led to the creation of criteria and checklists that the public broadcaster has set down as a quality benchmark for the design of appealing blended learning content for inclusive education. A number of revisions and new productions will still be necessary.

The broadcasting station is pursuing this emphatically. The subsequent embedding of the new materials in didactically meaningful teaching arrangements is a task for teachers. Even good blended learning materials do not automatically result in a meaningful learning environment. Further individualization and personalization must be accompanied. But the changes described here are important to reach equal learning opportunities with attractive digital media for every student.

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