Educational Development: Challenges, Opportunities, Tools and Techniques

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Abstract: As pointed out by many researchers, the ongoing pandemic has been a catalyst for educational development. With the increasing need for reskilling and lifelong learning, the current model of technology-enhanced learning needs updating, and so does also the university programmes for bachelor's and master's students. This study is based on an online brainstorming session and submitted development plans in the HEaD (Higher Education and Digitalisation) project, a five-year initiative for technology-enhanced educational development. HEaD is a development project aimed at supporting university teachers to work with research and development in the field of technology-enhanced and lifelong learning. As the research strategy, an action research approach was used, with the purpose of improving the educational process where authors also have the roles of teachers and facilitators. The aim of the study is to describe and discuss pilot project members' perceptions of challenges, opportunities, tools and techniques in higher education development. Data gathered from workshop discussion summaries and project plans were thematically analysed. Ideas from the workshop sessions were written down and saved with the use of the digital notice board Padlet. Results from the thematic analysis have been grouped into the four predefined categories of challenges, opportunities, tools and techniques. Findings show that course participants and project members have interesting ideas that have the potential to reinforce the current educational model at the university. Several tools and techniques that could support synchronous as well as asynchronous online learning will be tested and evaluated. Both the workshop summaries and the project plans show a high degree of creativity, but on the other hand, the method descriptions were scarce and would need improvement. The conclusion is that the project has had a good start if seen as development, but that there is a need for improvement and more input to achieve the intended core idea of research and development.

Keywords: educational development, pedagogical development, technology-enhanced learning, teaching and learning tools, pedagogical action research

1. Introduction

For many universities the Corona/Covid-19 pandemic has acted as a strong catalyst for educational development (Terenko & Ogienko, 2020; Tolks, Kuhn & Kaap-Fröhlich, 2020). The pandemic has clearly pointed out the need for new tools and new ideas for instructional design in higher education that is increasingly technology-enhanced (Agnoletto & Queiroz, 2020; Mozelius, 2020). At the Mid Sweden University, there is an ongoing discussion on the future role of higher education and lifelong learning has been combined with the ambition of being a leading university in the area of technology-enhanced learning. In this context the term technology enhanced learning is used with the idea presented in (Kirkwood & Price, 2014), there should not only be an increased use of technology, but also an improvement of teaching and learning practices. Moreover, the ongoing global shift to a knowledge society further increases the need for investment in human resources, and a flexible lifelong professional development for the next generation of the workforce (Bridgstock, 2017; Baporikar, 2016).

Considering lifelong learning, this is an old phenomenon that could be traced back to at least Ancient Greece and Plato's 'The Republic', with discussions on continuous learning to improve leadership (Williamson, 2008). Still makes sense, but lifelong learning today should better have a less elitist perspective and a more inclusive outline. The 17th-century Czech educationalist and philosopher Johann Amos Comenius advocated the modern idea of lifelong learning for all. These two aspects of lifelong learning were later combined by the French Enlightenment mathematician and philosopher Nicolas de Condorcet who claimed that lifelong learning should involve both professional and personal development (Jaldemark, 2020). In the discussion on lifelong learning Billet (2010) highlighted the importance of a distinction between lifelong education and lifelong learning, but in contemporary educational development the strive could be to combine the two aspects. Well-designed and challenging professional development might also lead to personal development.

To support the ambition of being a leading university in the field of technology-enhanced learning, the Higher Education and Digitalisation (HEaD) project was started. A five-year-long initiative, with the purpose of strengthening teachers' competence in the field of technology-enhanced and lifelong learning. The first pilot batch that this study is based on consists of four projects that all have a focus on educational development. The Vice-Chancellor and the HEaD team have high expectations, but what are the project members' perceptions?

The aim of the study is to describe and discuss pilot project members' perceptions of challenges, opportunities, tools and techniques in higher education development.

2. Extended background

2.1 The relationship between higher education and lifelong learning

Higher education and lifelong aspects of learning and teaching have a straightforward and complex relationship, including personal and professional development. This relationship enables opportunities for developing higher education as the highest level of the formal educational system. Therefore, higher education is a vital link to earlier levels, from kindergarten to upper secondary education. However, to be a part of an educational system from the cradle to the grave, higher education also needs to link to working life to offer continuing education and professional development beyond the formal degree programs they offer their students. To fulfil these promises of higher education, for example, one needs to find opportunities to collaborate with organisations in the surrounding society by offering courses built on the needs of professionals and organisations. However, such conditions are not limited to organisations in society. To be updated and relevant as a change agent in society, higher education institutions also need to offer continuing professional development for their employees.

Therefore, creating conditions for development is an important task. In other words, to enable opportunities for professional development in working life, higher education should offer lifelong learning opportunities for their employees. For many decades, the implementation of emerging digital technologies has been one field where higher education institutions need to support their employees with professional development. As mentioned in the 1990s by Anderson and Garrison (1998, p. 101), “nearly every communication medium has been adapted” and implemented in higher education settings. This development or movement in higher education continues while it follows the technological development in society. Subsequently, higher education institutions need to supply their employees with professional development throughout their working life.

2.2 The HEaD project

The Higher Education and Digitalisation (HEaD) project is a five-year initiative at Mid Sweden University to improve its capacity in the field of technology-enhanced and lifelong learning. The project not only focuses on developing the teachers’ pedagogical digital competence but also aims to improve the support structure available to teachers with respect to such competence development. Within HEaD, educational development projects are used as a means for teachers and support functions to collaborate on a joint development goal, as well as to develop their own competencies. As such, educational development projects can be seen as the core of the competence development activity as depicted in Figure 1. These educational development projects originate from teacher needs and opportunities, and thus an intrinsic motivation for teachers exists. Moreover, these projects provide concrete cases for educational developers and IT personnel to discuss with teachers, creating an interface for the exchange of knowledge, ideas and needs. Finally, the projects also create an opportunity to be studied by researchers in pedagogy, as well as to involve teachers more in action research.

In total, the HEaD project aims to run 34 of these development projects with a wide spread of topics and involved subjects. Besides co-financing the educational development projects, the HEaD initiative will also support teachers in initiating and conducting the projects, as well as in spreading their results. In 2021, the first four development projects were initiated in a pilot round. Each project is run by a team of teachers, collaborating with pedagogic developers, IT specialists, and researchers in the area of technology-enhanced learning. Thematically, the four pilot cases focus on: (1) interactive educational resources for increased activity in distance education; (2) simulations as a tool to train skills and situational awareness; (3) new approaches for audio-visual course design; and (4) student-teacher and student-student interaction in distance communication programmes.

Figure 1: Model of the HEaD project using development projects as concrete cases for teachers, support and researchers to interact on pedagogical competence development

2.3 Security regulations in the Swedish higher education context

Since Mid Sweden University is an authority, the same rules apply to the university as other Swedish authorities. This means that we are for example obliged to comply with the information security regulations issued by The Swedish Civil Contingencies Agency. We also must comply with the EU regulations, especially the General Data Protection Regulation (GDPR). This means that the expectations of teachers and students cannot always be met because some of the tools requested are not always intended for a professional environment. There are requirements for cloud service providers that social media platforms and pure entertainment services simply cannot meet. Their target group is not professional users, and their services are not developed to meet the demands of a company or a public business.

As a government agency, we need to be sure that the information in the cloud is protected based on the aspects of confidentiality, accuracy, and availability. All new cloud services requested by the users must undergo a procedure where the service is analysed and evaluated based on the requirements of an authority. A decision is then made on whether the service is approved to use within the university or not. It is therefore important to raise awareness among users about the challenges facing new cloud service providers and to ensure that the users have the right knowledge of existing and approved tools that often meet their requirements but which they may not be aware of.

3. Method

This study was carried out with an action research approach where the authors also have been teachers and facilitators in the HEaD project. Action research has been presented as a practical but systematic research method *"that enables teachers to investigate their own teaching and their student's learning"* (Nolen & Putten, 2007, p. 401*)*. The action research chosen for this study was in the British tradition as described by Norton (2009,

p. 71), an approach *"that links research to improvement of practice and is education orientated"*. With the idea that research results should have a positive impact on best practices in the next version of projects for educational development in the HeaD project. Furthermore, and also a recommendation by Norton (2009), academics should act as reflective practitioners in the higher education landscape to improve the teaching and learning processes. Finally, as suggested by Arnold and Norton (2021), action research should strive to bring change, innovation and educational development.

3.1 Data collection

Data were collected in a combination of course participants who submitted project plans and workshop discussions that were written down and saved with the use of the digital notice board tool Padlet. In an early stage of the development projects a preliminary project plan should be submitted, and later discussed with the project facilitators. Plans should involve things such as a presentation of the general idea, a time plan, a description of the alignment to teaching and learning activities, a method description, and an outline for how to evaluate the project. In an online workshop project participants first discussed potential obstacles in educational development, and later discussed group by group which aspects can make pedagogical development successful. The last part of the workshop was a general discussion where all participants shared ideas. Main ideas from all the workshop discussions were written down on so-called 'Padlet walls' (Ellis, 2015). This study used homogeneous purposive sampling, a method that focuses on a specific subgroup in which all the sample members share the same traits (Rai & Thapa, 2015). In this study, all the 10 informants, five men and five women, were university teachers from the Mid Sweden University, and participants in the HEaD project.

3.2 Data analysis

Data were analysed thematically and grouped into the four categories of Challenges, Opportunities, Tools and Techniques. Categories were created from a summary of frequent topics in the discussions at the online workshop. The analysis was carried out with inspiration from the six-step process outlined by Braun and Clarke (2006), and the top-down analytical approach with predefined categories as described by Lancia (2012). Out of the predefined categories, new themes emerged from the data in an analytical process that could be defined as a deductive-inductive analysis. The results from the thematic analysis have been presented with a grouping by the predefined categories, but with a discussion focus on the new emerging themes or subcategories. A few of the quoted comments were written in English on the Padlets walls, but the majority were written in Swedish, and have been translated to English by the authors. The translation was carried out with the idea of keeping the essential meaning but omitting Swedish idioms that would not make sense in English.

3.3 Ethical considerations

As in most forms of action research, authors had to consider the dual roles of being both teachers and researchers. A duality that was relatively easy to handle in this limited study, but with a risk for increased bias in future iterations. As pointed out by Nolen and Putten (2007, p. 403*)*: *"When the researcher is a member of and plays a role in the system under investigation, issues surrounding role definition, role ambiguity, and role conflict are often significantly greater than when a researcher enters the school as an objective outsider".* All informants have participated according to the principle of informed consent. With respect to informant integrity, all course participants have been kept as anonymous as possible.

4. Findings and discussions

Data sources have been thematically analysed and grouped into the predefined categories of Challenges, Opportunities, Tools and Techniques.

4.1 Challenges

In the comments from the first workshop activity, several potential challenges can be found. Several participants brought up issues with project management and the lack of concrete planning for how the project should be conducted. Several comments also on limited technology, lack of time to explore alternative solutions, and the problem with an overloaded IT Helpdesk. This could be interpreted as expressions for problems in previous projects, and one of the informants wrote that there is an issue *with "Overloaded staff at the IT-helpdesk, who have to answer simple questions that could be answered by colleagues, instead of helping out with the educational development"*. There are also worries that the projects could lack alignment with the university, the

actual department and the daily teaching and learning activities. Informants wrote on the Padlet walls that *"Projects might not be well-aligned to the daily activities"*, and that *"Project plans that are not concrete enough, could make the project go down the drain, or that there will be more of talking than doing"*.

Furthermore, there were concerns about the security restrictions for testing new technology, and that the Moodle virtual learning environment would not be flexible enough for the implementation of all project ideas. Another comment was on the more general risk of getting hampered or limited by university regulations. One informant raised the question about appropriate data collection for the project evaluation, and another mentioned the problem with internal communication, and how and where to share ideas. Finally, several informants bring up the risk of ending up in time trouble, either by getting stuck in their daily work or by poor project management. Another mentioned challenge is that the HEaD overhead' could steal time from the actual project work.

4.2 Opportunities

A lot of interesting opportunities were found, both in project plans and on the Padlet walls. There are also examples of when opportunities could build on challenges like it often is in action research. This could be summarised in the comment with *"There are more general problems to address where their solutions could improve the daily work"*. What is pointed out as a crucial opportunity is *"Easy access to resources that can be explored in the projects"*. An idea could be to create a digital repository, storing resources that pass the security regulations. Easy to write in a research paper, but not that hard to implement either as a part of the university intranet. Another opportunity for a five-year project is certainly "*To create animated meeting fora for teacher-to-teacher discussions", to share the lessons learnt from projects"* and *"Investigating best practices in the field of technical and pedagogical solutions"*. Followed up by *"Mapping the found best practices to teachers' and students' actual needs"*.

Moreover, it seems as an important opportunity *"To add value by documentation, evaluation and dissemination"*, and to enable Interaction and discussions with colleagues, teacher teams, and students. A way of facilitating projects would be by "support from the university's internal and external networks", that is specialised in technology-enhanced learning. With thorough support, it would be opportunities for *"Concrete development, testing and evaluation"*. Moreover, facilitators should encourage project members to "use our new digital toolbox with an open mind" and facilitate *"The internal communication"*. This might be implemented as workshops and seminars to share and compare the best practices that emerge from the projects. Comprising the idea of future HEaD projects that work with further development of completed project deliveries.

4.3 Tools

The submitted project plans include several tools where the majority are communication and feedback tools. During the online workshop, project participants brought up the need for new add-on tools to improve both the teacher-student dialogue and the student-student dialogue. In the university's ordinary toolbox teachers have the Moodle virtual learning environment for asynchronous activities, and the Zoom video conferencing system for synchronous teaching and learning activities. Two systems that offer a reliable ground for most university courses, but there also is a need for more informal communication, and tools that support extra-curricular activities. In the same way, as the pandemic has increased the need for technology-enhanced learning, there seems also to be an increased need for more informal communication to break isolation and increase student satisfaction. An example of a popular tool for informal communication is Discord. A tool that initially was developed for the gaming community, but later has become a popular social platform for a more general younger audience (Cortés-Ramos et al., 2021).

Another interactive tool for teacher - student communication is FeedbackFruits, with the potential to stimulate active learning through instant feedback. A tool that seems to have the potential to support student engagement and a more agile teaching style (Rinaldi & Hasan, 2021; de Kok & Nguyen, 2021). All of the tools mentioned above are fully developed and user-friendly. Tools that could be used by all teachers and students, and tools that are relatively easy to install. On the other hand, they might clash with the security regulations described under 2.3, and the GDPR privacy and security law. Finally, a more complex tool that bridges over to the next category of techniques, the HTML5 Package (H5P). A package including the HTML5 components HTML, Cascading Style Sheets and Javascript, and a package that can be integrated with the Moodle virtual learning environment (Wehling et al., 2021). With the use of H5P, teachers or students can relatively easily create

interactive content such as quizzes, drag and drop assignments, voice interaction or interactive videos (Hettiarachchi, 2021).

4.4 Techniques

H5P could also be seen as a technique to align teaching and learning activities with the revised version of Bloom's well-known taxonomy of cognitive levels (Desai & Kulkarni, 2022). Bloom's Taxonomy is a classification of the six levels of thinking that should be considered in the creation of course objectives and course activities. This taxonomy was also brought up in the discussions at the online workshop where participants and facilitators agreed on the relevance of involving Bloom's Taxonomy in pedagogical development with H5P as an interesting tool for constructive alignment. Another technique mentioned in the project plans is mannequin simulation, a frequently used technique in nursing education and healthcare programmes. Simulation mannequins could briefly be described as realistic dolls that could monitor and display techniques such as pulse, blood pressure, EKG and arterial wave forms. Before the Corona pandemic mannequin simulation worked well in onsite activities, but the technique needs adoption for pure distance teaching. An alternative would be to use virtual reality simulations, but as highlighted in the workshop discussions high-fidelity mannequins would probably be a better stress test. Finally, a technique for improved visual communication presented in a project plan is the so-called boxing technique. Boxing should here be interpreted as a grouping of course content with an appealing graphic design. A concept resembling the 'Box layout' in the Java programming language or the boxing of content in web design that is implemented with the use of cascading style sheets. Boxing should support symmetric as well as asymmetric design ideas with the idea of flexible modularisation that is described in (Hampton-Smith, 2016).

4.5 Emerging themes

Three new themes emerged from the analysed data, where all of them can at the same time be seen as both challenges and opportunities, and partly as techniques. If considered in the future project batches, they all have a potential to improve the educational development.

Planning

Findings show examples of both careful planning as well as lack of planning. A thoughtful comment was that there should be a "*project planning that shouldn't overload the facilitating resources"*. Several participants also brought up worries over how to use the given time resources. Project management looks like a crucial factor and there are comments on the Padlet wall about *"What to do and when"* and," How *to involve students and colleagues, and to what degree"*. Regarding the limited time quota for the projects, it must be important to *"Have a realistic workload and continuous-time for the development project".*

Methodology

There were also comments on "*Support for relevant methodology and appropriate data collection"*, which of course could be a part of activities in later workshops. Besides the requests for research methods, there was also a question about project management methods and how to *"Use an agile project form".* The Padlet section on 'Literature and writing' was empty and without any comments, something that raises the question about a recommended literature list.

Discussion and dissemination

What appears to be a sensible question is *"How to reach out to colleagues, teacher teams and other departments at the university?".* Something that could be arranged in collaboration with the facilitators and instructors in the HEaD team. Moreover, it is important with *"Interaction with students and student unions"* and to get continuous feedback from students. Finally, a positive finding was that some participants brought up the idea of presenting results at international conferences and publishing in quality research journals.

The workshop activities started with discussions on challenges, which might explain the rich number of comments on project details that might go wrong. In the next batch of projects, the order should be shifted, with project opportunities discussed first. The data collected in this study is limited to only four projects. In the

next project batch, involving 10 development projects, the relations in Figure 2 here below could be further evaluated and extended.

5. Conclusion

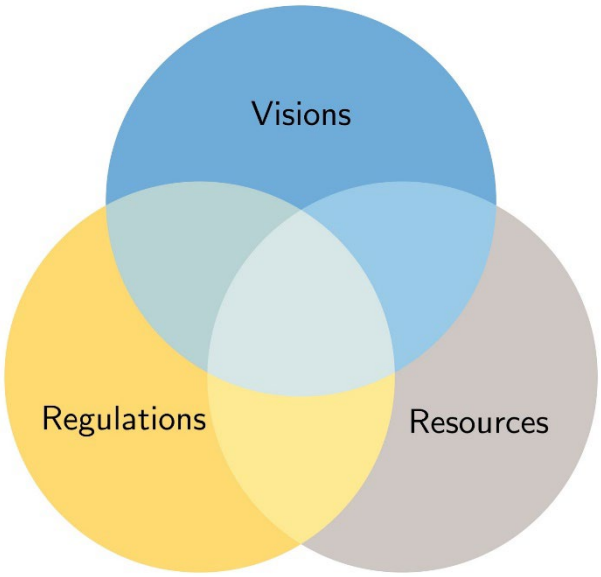

Figure 2 Sustainable educational development projects occur in the intersection between teachers' visions, regulations and available resources

With the aim to analyse the perceptions of participants in a five-year university initiative on technology-enhanced and lifelong learning, data on perceived challenges and opportunities, as well as planned techniques and tools were studied. The data showed that the participants had clear visions and ideas regarding applicable techniques and tools, but that challenges are expected particularly with respect to time and resource management, as well as available support. It becomes obvious that educational development occurs in the cross-section of the teachers' visions and ideas, the regulations the university has to follow, as well as the available resources for implementation and continued management (see Figure 2). In order to lead to sustainable solutions, all three components need to be considered and intersecting regions need to be found. It also seems obvious that the manner in which educational development projects are conducted can have a tremendous impact on finding the sweet spot for sustainable educational development activities. Early involvement of key stakeholders in the development process is essential, which confirms the HEaD model of connecting teachers with domain specialists right from the start. However, the involvement of management in such dialogues could be further strengthened to address the resource aspect, as many participants lifted concerns about the effect of high workloads.

6. Future works

The lessons learnt from this study will be applied in the outline of the next batch of projects. With the action research idea of an iterative improvement, all batches of projects should be evaluated and analysed to improve the quality of educational development. Results from the development projects should be disseminated both internally at the university, and externally by research publications. There is a current a boom of articles dealing with the aspects of education development during and after the pandemic. In this article we have just scratched on the surface, and our estimation is that this emerging field would require a separate study on its own. Important topic to bring up in this future study would be to explore the importance of relevant methods in educational development projects as suggested by Godsk (2022). Another topic to consider is the need for an inclusive framework for the scholarship of educational development as pointed out by Cruz et al. (2022). Finally, the model suggested above is a first draft that should be evaluated and refined both by project results, and by a systematic literature review on 'Educational development'.

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References

Agnoletto, R., & Queiroz, V. 2020. COVID-19 and the challenges in education. *The Centro de Estudos Sociedade e Tecnologia (CEST)*, *5*(2).

Anderson, T., & Garrison, R. 1998. Learning in a networked world: New roles and responsibilities. In C. C. Gibson (Ed.), *Distance learners in higher education: Institutional responses for quality outcomes* (pp. 97-112). Atwood.

Arnold, L., & Norton, L. 2021. Problematising pedagogical action research in formal teaching courses and academic development: A collaborative autoethnography. *Educational Action Research*, *29*(2), 328-345.

Baporikar, N. 2016. Lifelong learning in knowledge society. *In Impact of Economic Crisis on Education and the Next-Generation Workforce* (pp. 263-284). IGI Global.

Billett, S. 2010. The perils of confusing lifelong learning with lifelong education. *International Journal of Lifelong Education, 29*(4), 401-413

Braun, V. & Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), pp.77-101.

Bridgstock, R. 2017. The university and the knowledge network: A new educational model for twenty-first century learning and employability. *In Graduate employability in conte*xt (pp. 339-358). Palgrave Macmillan, London.

Cortés-Ramos, A., Torrecilla García, J. A., Landa-Blanco, M., Poleo Gutiérrez, F. J., & Castilla Mesa, M. T. 2021. Activism and Social Media: Youth Participation and Communication. *Sustainability*, *13*(18), 10485.

Cruz, L., Dickens, E., Flaming, A.L.B. and Wheeler, L.B., 2022. Embracing complexity: an inclusive framework for the scholarship of educational development. *International Journal for Academic Development*, *27*(1), pp.45-57.

de Kok, E., & Nguyen, N. 2021. Utilizing Pedagogical Technology to Facilitate Peer and Group Feedback in Hybrid Courses-A Case Study.

Desai, T. S., & Kulkarni, D. C. 2022. Assessment of Interactive Video to Enhance Learning Experience: A Case Study. *Journal of Engineering Education Transformations*, *35*(Special Issue 1).

Ellis, D. 2015. Using Padlet to increase student engagement in lectures. In *14th european conference on e-learning: ECEL 2015* (pp. 195-198).

Godsk, M., 2022. Learning Design as an efficient educational development methodology: conceptualization, assessment, and practice. In *Handbook of Digital Higher Education* (pp. 38-50). Edward Elgar Publishing.

Hampton-Smith, S., 2016. CSS Flexible Box Layout. In *Pro CSS3 Layout Techniques* (pp. 73-101). Apress, Berkeley, CA.

Hettiarachchi, E. 2021. Online Workshop on Creating Interactive learning Content using H5P.

Jaldemark, J. 2020. Formal and informal paths of lifelong learning: Hybrid distance educational settings for the digital era. In M. Cleveland-Innes & R. Garrison (Eds.), *An introduction to distance education: Understanding teaching and learning in a new era* (2nd ed., pp. 25-42). New York: Routledge.

Kirkwood, A. & Price, L., 2014. Technology-enhanced learning and teaching in higher education: what is 'enhanced'and how do we know? A critical literature review. *Learning, media and technology*, *39*(1), pp.6-36.

Lancia, F. 2012. T-LAB pathways to thematic analysis. *Retrieved on October*, *26*, 2012.

Mozelius, P. 2020. Post Corona Adapted Blended Learning in Higher Education. *In Responding to Covid-19: The University of the Future:* / [ed] Dan Remenyi, Ken A Grant and Shawren Singh, Reading, UK: ACIL

Nolen, A. L., & Putten, J. V. 2007. Action research in education: Addressing gaps in ethical principles and practices. *Educational researcher*, *36*(7), 401-407.

Norton, L. 2009. *Action research in teaching and learning: A practical guide to conducting pedagogical research in universities*. Routledge.

Rai, N., & Thapa, B. 2015. A study on purposive sampling method in research. *Kathmandu: Kathmandu School of Law*, 1-12.

Rinaldi, M., & Hasan, D. 2021. Stimulating active participation with class materials using Interactive Document. *e-mentor*, (3 (90)), 84-90.

Terenko, O., & Ogienko, O. 2020. How to Teach Pedagogy Courses Online at University in COVID-19 Pandemic: Search for Answers. *Romanian Journal for Multidimensional Education/Revista Romaneasca pentru Educatie Multidimensionala*, *12*.

Tolks, D., Kuhn, S., & Kaap-Fröhlich, S. 2020. Teaching in times of COVID-19. Challenges and opportunities for digital teaching. *GMS journal for medical education*, *37*(7).

Wehling, J., Volkenstein, S., Dazert, S., Wrobel, C., van Ackeren, K., Johannsen, K., & Dombrowski, T. 2021. Fast-track flipping: Flipped classroom framework development with open-source H5P interactive tools. *BMC Medical Education*, *21*(1), 1-10.

Williamson, T. 2008. The good society and the good soul: Plato's Republic on leadership. *The Leadership Quarterly*, *19*(4), 397-408.