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# Artificial Intelligence and Learning Activities

## Innovative impact

This chapter outlines an AI Pedagogy Planner combining six suggestions of learning activities with eight types of AI applications that may be used by instructional designers.

We contend that the decision support tool based on a picker wheel approach to AIED could be used in practice by instructional designers to facilitate pedagogically based decisions in the process of building the curriculum in higher education.

Educators should lead AI.  
Educators should not be led by AI.

## Introduction

The purpose of this chapter is to discuss the pedagogical applications of artificial intelligence in higher education and to answer the overall question: how AI applications may support specific online learning activities in higher education?

The study draws on empirical insights from a structured analysis of nine different cases, describing nine AI applications in higher education in Portugal, the United Kingdom and Denmark, respectively. The analysis of the nine cases focused on particular parameters that may be connected to pedagogical and/or didactical factors related to the actual use of AI in Education.

In a recent article offering a systematic review of research on artificial intelligence applications in higher education, Zawacki-Richter et al. (2019) ask a crucial question. Based on their comprehensive systematic review they ask: "where are the educators?" This question has been raised before by Holmes et al. (2019) and in other variants by Rogarten et al. (2018), Rienties et al. (2020), Simonsen (2020a), and it is definitely about time that we discuss potential pedagogical approaches to artificial intelligence applications in higher education. The analysis of the cases used in this paper are related to the question raised. We will try to answer that and propose a conceptual discussion of how elements from the ABC Learning Design Approach (Young & Perovic, 2016) may be combined with an emerging framework outlining potential applications of different AI technologies, based on the three-tier classification developed by Luckin et al. (2016), Holmes (2019a) and Holmes (2019b).

## AI Applications in Higher Education

Existing literature does not fully discuss the potential associations between AI applications and learning activities in higher education. Holmes et al. (2019) do discuss how AI works in education and how different AI applications work in education, but they do not propose an overall pedagogical framework indicating which type of AI application can be used to support a specific learning activity. Zawacki-Richter et al. (2019) even ask, "where are the educators?" And the educators have so far played an almost non-existing role in the development of AI applications for higher education.

The overall classification of learning and artificial intelligence we

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propose (Holmes et al., 2019) uses three main descriptors of AI in education. The classification is very relevant to this discussion as it divides the overall uses of AI in education into three main areas: Learning with AI, Learning about AI and Learning for AI.

However, we still miss a recognized pedagogical approach that allows us to describe systematically which AI applications to use to support specific learning activities and to reach specific learning objectives. So, we need a third theoretical building block. For this purpose, we selected elements from the ABC Learning Design method (Young & Perovic, 2016), which builds on Laurillard's six learning types (Laurillard, 2012). The ABC Learning Design approach recommends that educators work together in teams to design a visual storyboard outlining the structures and sequences of learning activities, which are required to meet specified learning outcomes.

The six learning types or activities outlined in the ABC Learning Design method include: acquisition, collaboration, discussion, investigation, practice and production. The definitions of each learning type can be found in Young & Perovic (2016) and are written on the actual cards used in the ABC Learning Design method. Structures and sequences are created with these cards as if it were a Lego game.

## AI Pedagogy Planner

The idea of using an instructional design approach in the building of HE programmes has had a huge impact on educators and researchers all over the world, so we developed the AI Pedagogy Planner based on Bower (2008), Laurillard (2012), Fung (2015), and (Salmon, 2013). Let's first outline how the ABC Learning Design method works.

The AI Pedagogy Planner is a so-called decision tool, where you start with the inner white wheel. First, you select the type of learning that you want to work with, at a particular stage in your curriculum design, by turning the inner wheel either left or right. The abbreviations ACQ, COL, DIS, INV, PRA, and PRO are the six learning types listed in the left-hand side of Figure 1.

Having selected the learning type, then it is time to select the AI learning types (Bidarra et al. 2020). The educator now selects the AI learning type in question, that is, whether it is learning WITH AI, learning ABOUT AI or learning FOR AI, by turning the second light-grey wheel. The abbreviations LWAI, LAAI and LFAI are the three AI learning types listed in the left-hand side of Figure 1.

Next it is time to select the actual AI application, which the educator can use to realize the didactical learning activities required. The educator now turns the outer dark grey wheel and selects the AI application(s), which support(s) the selected learning type in question.

Once the learning type, the AI learning type and the equivalent AI applications have been selected, the educator flips the decision tool and gets concrete pointers to actual exercises, practical learning activities and AI tools that may be used to realize the learning outcomes of the programme in question. The abbreviations AWE, CB,

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Young, C., & Perovic, N. (2016). Rapid and Creative Course Design: As Easy as ABC? *Procedia - Social and Behavioral Sciences*. Volume 228, pages 390 – 395.

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DBTS, ELE, ITS, LL, LA and AR/VR are abbreviations of different AI applications listed in the left-hand side of Figure 1.

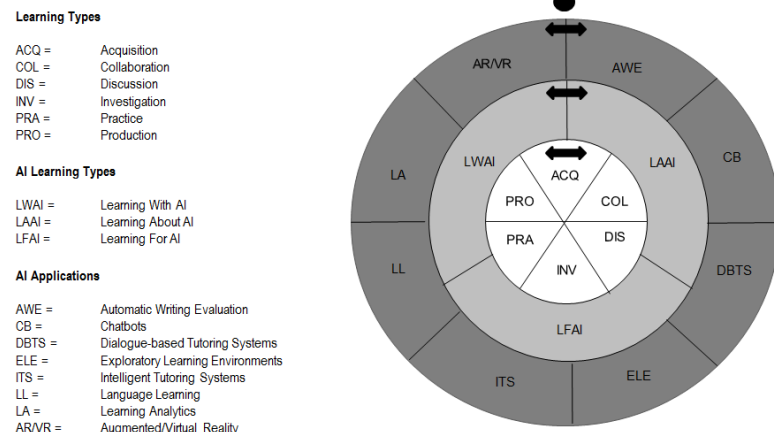


Figure 1. AI Pedagogy Planner

This follows the process used in the ABC Learning Design method, a practical and hands-on approach where educators are asked to develop a programme using a storyboard and cards. The storyboard structures the programme in question in a timeline and the cards are placed in the desired sequence to support the learning objectives in question. On the front of each card the overall type of learning activity appears and the educator places several learning type cards on the storyboard, to structure and sequence the learning programme. All these choices are, of course, made to support the learning objectives of the programme. Once satisfied, educators are then asked to flip the learning type cards and select or define the actual learning activities on the back of the card in question. Having gone through this process, all pedagogically relevant choices have been made and educators can start developing the final didactical activities in the classroom or the LMS in question. The same essential process has been used in the AI Pedagogy Planner.

## Conclusion

This chapter analysed and discussed pedagogical applications of artificial intelligence in higher education and examined how AI applications may support specific online learning activities in higher education.

We contend that the decision support tool based on a picker wheel approach to AIED could be used in practice by instructional designers to facilitate pedagogically based decisions in the process of building the curriculum in higher education. Educators should lead AI. Educators should not be led by AI.

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