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**ICT in education**  
**Lifelong learning**  
**Business and technologies**  
**New trends in management**  
**Teaching methods and programs**

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*Dear E-mentor readers,*

It is my great pleasure to present the next English volume of the academic journal *E-mentor*. We continue our attempts to reach the international audience both from academia and from business with the latest results of research related to teaching and learning with technologies and to knowledge management in modern organizations. In this volume, one can find the whole spectrum of issues regarding lifelong learning. First, the article on the use of blended approach to helping children with speech difficulties, then the example of preparing university students for research work and another two papers analyzing the behavior of the participants of online classes (Planer-doer model and task difficulty analysis) to end up with the retrospective analysis of educational choices made by adult learners.



I would also strongly recommend the interview with Olivier Crouzet, one of the main actors in the “born to code” movement originated in Paris in 2013 and widely known as Ecole 42 (in French) or School 42 (in English). Concerning knowledge management, it is worth to mention the article on the role of mindfulness in transforming the competencies of contemporary leaders.

We continuously undertake the efforts to adjust our publication process to the international standards better; therefore, starting from issue No 4(81)/2019, every author’s name is accompanied by their ORCID number if applicable.

The process of publishing the international versions of *E-mentor* entirely in English will be continued in the year 2020 as well. We do encourage the researchers both from academia and from business to publish with us. *E-mentor* is an open-access journal available for free online and in printed form. There is also no charge for publishing. All scientific papers are peer-reviewed (we apply the double-blind review procedure), and the journal is indexed in several international databases, including Web of Science ESCI and EBSCO.

A brief guide for Authors can be found on last but one page of the journal. More detailed instructions and the submission form are available online at [http://www.e-mentor.edu.pl/eng/page/8/Info\\_for\\_Authors](http://www.e-mentor.edu.pl/eng/page/8/Info_for_Authors). If you have any questions concerning the publication in *E-mentor*, please contact the editorial team at [redakcja@e-mentor.edu.pl](mailto:redakcja@e-mentor.edu.pl).

Maria Zajac  
Editor



Ministerstwo Nauki  
i Szkolnictwa Wyższego

„Kontynuacja działań na rzecz zwiększenia międzynarodowego zasięgu czasopisma *E-mentor* w wersji drukowanej i online (o otwartym dostępie)” – zadanie finansowane w ramach umowy nr 693/P-DUN/2019 ze środków Ministra Nauki i Szkolnictwa Wyższego przeznaczonych na działalność upowszechniającą naukę.



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and Higher Education  
Republic of Poland

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## Developing Scientific Work Practice in Business Informatics – Digital Support for Design Science-based Research Projects

Christian Stary\*

### Abstract

When academic students are introduced to scientific work, they need to become familiar with how to select a research topic, to identify research goals, and to structure a research project accordingly. In Business Informatics, research practice is increasingly following a design science approach. In this contribution, we introduce a corresponding digital support scheme. It is based on cognitive apprenticeship and scaffolding to specify the research questions and derive requirements from a problem statement for possible solutions. Learners are supported in a socio-cognitive way, as the set of digital learning-support features comprises peer-to-peer interactions, content co-construction, and a portfolio-like documentation scheme. Context-sensitive (focused) interaction and organizing group work facilitate content co-creation and effective information sharing. They support self-managed scientific skill development while being able to follow structured research procedures.

**Keywords:** scientific work, research practice, research proposal, design science, learning support, social interaction, self-managed learning, cognitive apprenticeship, scaffolding, learning management

*Academic studies comprise skill development in scientific work practices. Scientific research, whether in the natural or social sciences, is a set of skills referring to a “continual process of rigorous reasoning supported by a dynamic interplay among methods, theories, and findings. It builds understandings in the form of models or theories that can be tested” (National Research Council, 2002, p. 2). When being introduced to scientific research work, students are guided by several principles. The first and crucial one is posing “significant questions that can be investigated empirically: moving from hunch to conceptualizing and specifying a worthwhile question is essential to scientific research. Questions are posed in an effort to fill a gap in existing knowledge or to seek new knowledge, to pursue the identification of the cause or causes of some phenomena, or to formally test a hypothesis.” (ibid, p. 3) The questions lay the groundwork for study designs and should “reflect a solid understanding of the relevant theoretical, methodological, and empirical work that has come before.” (ibid, p. 3)*

### Introduction

Research questions play a crucial role when setting up research proposals. These proposals contain several key elements, the most prominent being what research question is to be developed. Student guides characterize research questions through their

usefulness in academic work, such as Zina O’Leary (2017, p. 83): “a well-articulated research question (or hypothesis) should define your investigation, set boundaries, provide direction and act as a frame of reference for assessing your work. Any committee reviewing your proposal will turn to your question in order to obtain an overall sense of your project.” Other key elements of research proposals are how the research question will be studied, existing studies on the addressed question, effort in terms of time and costs to be spent (including evaluation of results), and the benefits for the involved or addressed stakeholders (Klopper, 2008; O’Leary, 2017).

Research questions are traditionally developed as part of the initial requirements for writing a seminar work or thesis. As such, they form the baseline and starting point for scientific inquiry. In the beginning, students may experience difficulties, both in terms of scoping and formulating a set of research objectives. This may require a substantial effort in re-adjusting their work and investigation results if the research question was not prepared in an informed way and documented coherently (cf. Klopper, 2008; Thomas, 2017).

In Business Informatics, the field from which this work originates, research questions address engineering as well as empirical, mostly management aspects

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(cf. Laudon, K. C. & Laudon, J.-P., 2017). Hence, research in this field can be related to both the organizational and technological aspects. For instance, Business Process Management addresses the organization of human work while aiming to support stakeholders by technological means in accomplishing their tasks. When formulating research questions, students need to be aware of this duality, as research methods can be bound to different aspects.

A research question may then address both aspects, which need to be reflected in the selection of a suitable method for the study, e.g. beginning with a conceptual analysis of the human work in a certain domain through storytelling, followed by subject-oriented process specifications that can be executed, and finally completion by evaluating the effects of digitally supported processes on the KPIs in the affected technical domain. To pursue multiple perspectives and targets, research projects increasingly follow a 'design science' approach (Hevner, March, Park, & Ram, 2004; Hevner & Chatterjee, 2010). This is driven by a problem-oriented research question, and allows the handling of the respective requirements in a step-by-step procedure that also takes into account the relevant theories in an iterative way. In Business Informatics, design science facilitates a structured problem solution approach, since most questions require structuring the research in a multi-perspective and agile way (Wieringa, 2014).

This contribution is about the learning support for developing research capacities through design science cycles. It has its focus on structuring research objectives based on a research question, to create a problem description driven by interest and curiosity, and deriving the requirements for possible solutions. In section 2 we introduce the design science research approach and thus provide the methodological context

for setting up a research agenda. We also introduce the educational means for specifying a problem-based research question and the requirements to be met by the solutions. In section 3 we discuss digital support features with respect to encoding scaffolds along a cognitive apprenticeship process. Section 4 provides the first insights into implementing the approach. Section 5 concludes the paper, summarizing its objectives and achievements, and sketching further research issues with respect to effective learner support.

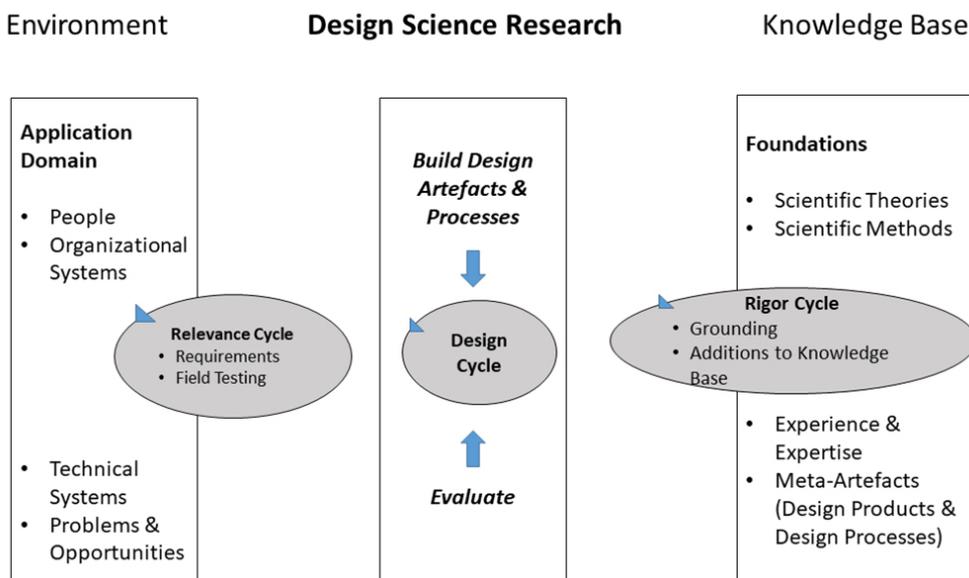
## Methodological and Educational Foundation

In this section we provide design science support and educational means for introducing scientific work practice to students. We start out with design science as a methodological framework, before addressing the specification process of a research question, structuring the design cycles. We then introduce cognitive apprenticeship and scaffolding for learner support when building capacity in design science practice.

### Objectives and requirements – organizing scientific work practice

Design Science has attracted significant attention over the past decade (cf. Hevner, 2007; Baskerville, Baiyere, Gregor, Hevner, & Rossi, 2018). Its dual while iterative and problem-driven nature with respect to design artifacts and design theory equally supports practical development and conceptual understanding. The Relevance Cycle (Figure 1) connects the environment of a research project with the core development activities. The Rigor Cycle relates these activities to a knowledge base informing the project. The Design Cycle iterates between the core development activities, i.e. building and evaluating artifacts.

**Figure 1. Design cycles embodied in a pragmatic and methodological context**



Source: Hevner, 2007.

The original format has been operationalized by Ken Peffers et al. (2006) allowing the framing of the research capacity construction stages as shown in Figure 2. In a research project, the learners are in control of the learning process while being guided by a facilitator or mentor. Learning activities are initiated by a research question that stems from individual interests in Business Informatics topics (cf. O’Leary, 2017). In the first step, while detailing the research question, the learners define the problem to be investigated and set the scope of the research project. The research project itself starts with a systematic refinement process intended to achieve a concrete goal, learning outcome(s), intervention and mediation activities in order to meet the objectives. This stage also addresses the competences. Knowing refers to having knowledge and fundamental understanding. Applying empowers the researcher in planning and producing an artefact by means of scientific research in an informed way. Innovating means novel developments through the use of Information System technologies.

In order to structure the activities in the project, a learning contract is negotiated between all the members of the project and those responsible for the project. This is documented and signed by all parties, with the learning outcomes also used to provide the basis for evaluating the research project results. A learning contract comprises the following.

- Research project organization: project name, duration, f2f-requirements, credits, contact, role(s) in the project, relation to other project groups or projects.
- Addressed level(s) of competence: 1 – Knowing, 2 – Applying, 3 – Innovating.
- Research objectives: includes the justification and desired competence level.

- Content-related activities: relates to the research activities in particular, search items and patterns, and resources (digital libraries, infrastructure, prototyping environment).

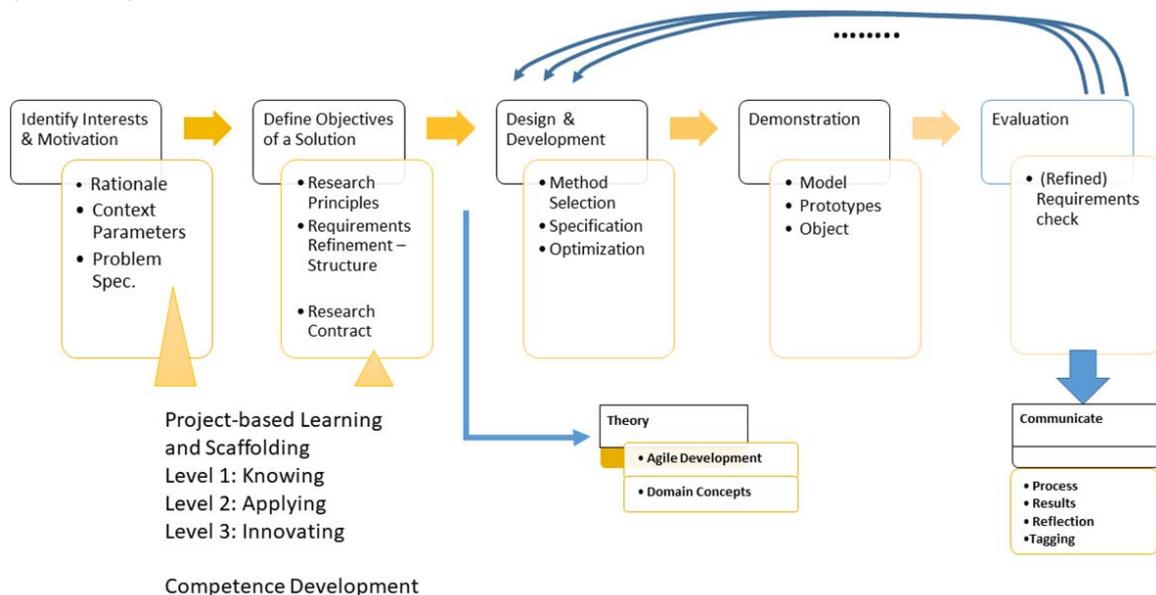
In Business Informatics, research problems are likely to be multi-dimensional. Consider the case of decision support for management in the course of digitizing business processes: social aspects may be affected when reorganizing work processes in terms of information system architectures, such as service-oriented computing, and technological ones, such as shifting operations from a legacy system to a service-based cloud infrastructure.

Design science allows the structuring of the problem-solving procedure along these dimensions. For the problem, the first iteration could include building a prototype from a process-perspective using S-BPM, applying the corresponding agile development concept (Fleischmann, Schmidt, & Stary, 2015). The second iteration could use the running processes to define the services, e.g. using Archimate (www.archimate.org). For both iterations, the initially identified requirements, namely, to achieve vertical and horizontal digital process integration, is evaluated using specific use cases.

The design cycle activities within a research project can be of various types.

- Working on content: this refers to developing the content that belongs to the research project at hand. This content should be available to learners at any time during their project, and thereafter for self-studies in the form of videos, multimedia documents, additional resources, and examples. Usually, content is studied in individual learning phases prior to the interaction phases. This is prepared by facilitators or peers for effective knowledge creation.

**Figure 2. Design Science research procedure**



Source: Peffers et al., 2006.

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- Research Project Management: during their project work, all learners acquire competences in the planning, calculation, execution, and evaluation of research projects. The design science approach already pre-structures a project, including the design and evaluation iterations when working on a problem solution.
- Applying acquired content in the context of project work: here the learners work on their artefact. The learning contract and design science process provides some structure for evaluation and reflection. When support for research practice is required then a facilitator, mentor, or expert can be contacted in addition to peers.

The project work (i.e. problem-solving tasks) can be accomplished in various forms:

- Self-study: each learner acquaints themselves with the relevant knowledge content for their concern. Content is prepared for learning support as well as created by learners in the course of their project work. Due to the direct relation to the research project, content is mainly recognized in its respective project context and can therefore be perceived sustainably.
- Peer-to-peer setting: the learners form part of communities they organize in order to collaboratively plan and design the implementation of research projects. The group affiliation, the bottom-up sense of community, and the responsibility of each individual for the success of the project work of the group increases the intrinsic motivation and thus the efficiency and sustainability of the learning process.
- Knowledge transfer: each project step should be documented in a sharable memory, in order to be communicated for further work and/or feedback. Communication is considered a dedicated step concluding a design science projects (see Figure 2).

Overall, the design science framework provides an iterative and procedural approach to organize scientific work based on an initially specified research question defined in terms of a structured problem description and requirements list for possible solutions. It allows the use of multiple work formats, both from the facilitator and learner perspective.

## **Scientific work practice – Specifying a research question**

This section contains findings for setting up a research question while referring to the first two phases or elements of the Peffers et al. (2006) operational framework, as they are crucial for scientific skill development and introducing scientific work practice to learners. A research question has to be in line with learner interests, which should drive the development process. As such it needs to be viewed as a highly reflective and interactive process.

The initial step in capacity building on scientific work practice has a social dimension beyond the cognitive challenges. According to Rüdiger Jacob (1997, pp. 11–18), the choice and concretization of a topic in terms of

a research question starts with recognizing some theory or concept framing the question to be examined. This step is essential because it influences the further course of the research process. While in academic research internships or seminars the (general) topic may be given, with promotions, the self-managed framing and formulation of a research question is usually mandatory. In both cases, however, the subsequent step is identical: the topic needs to be scoped and placed into some level of focus. For this purpose it is advisable to document everything in a working group (or even alone) by means of structured encoding, and then arrange it accordingly. For workgroups, a facilitator should ensure that discussions do not create confusion and that the contributions of all group participants are considered.

As the facilitator should not intervene content-wise in the discussion, the role should be concerned about traceable structuring inputs and agreements, e.g. using cards for detailing a topic according to various perspectives. Each card should detail exactly one idea, concept or thought. Such a procedure ensures that the ideas can be arranged and structured in a variety of ways, by assigning the inputs to different headings. It is recommended to make this process public, e.g. by putting it on a digital white board, as used with meta-plan elements leading to clusters of inputs.

The aim of this exercise is to develop a more concrete understanding of the subject area. It helps to scope the research question and to create a descriptor catalog for the search and viewing of problem-relevant information. It may help to look for central concepts related to the respective topic in relevant thesauri or scholarly works, in order to obtain a first overview of the topic. This first systematization of the topic is very likely not the last one, as it is based on more or less deep prior knowledge, assumptions and everyday hypotheses, and may need to be modified in the course of increasing knowledge about the respective topic and understanding of the research question (cf. Jacob, 1997; Lu & Mantei, 1991).

Even though learners likely need to leave their comfort zone to anticipate all the results of building their capacity, they need to be encouraged to keep a record of ideas, thoughts, and arguments – it enables them to experience working with raw information as a positive task. In addition, they can profit from the reduced cognitive load and further reflect on the documented information. Consequently, when a topic is edited, all the intermediate results and working papers should be archived or kept accessible for each community member (cf. Klopper, 2008; Navidi, Hassanzadeh, & Zolghadr Shojai, 2017).

A common repository created in the context of developing a research question could include keywords, bibliography, presentation material etc. as well as the date and the name of the editing person. Such shared documentation increases the liability of group work, and documents the progress of the work in a traceable way. In addition, when information is edited by a workgroup, the internal division of labor increases the productivity of the group. Nevertheless,

each member of the group is accountable for the topic and should be informed on the state of affairs, results or problems. Formulating and specifying a research question is an iterative process, during which an initially very generally understood topic or idea is refined through various cycles. How these processes are designed highly depends on the way a learner is organized and committed (cf. Matzler, Renzl, Mooradian, von Krogh, & Mueller, 2011).

Content-wise, setting up a research question includes the (theoretical) frame of reference in which a problem should be understood and solved (Jakob, 1997). Its associated research goals can address exploratory research, where one is interested in the manifestation or distribution of certain characteristics. It could refer to the testing of hypotheses, i.e. whether a problem should be conceptually discussed using very specific theories, principles or lines of arguments. The research goals are always the result of a selection made from a variety of possible questions or potential strands of investigation.

This choice needs to be justified using the (theoretical) frame of reference. When referring to the natural sciences, the work traditionally aligns with confirmed, largely consensual theories, standard procedures and formalized models. Research in the socio-technical, social, and economic sciences are much more theory-based and method-dependent, as in many cases there is a special relationship between the researcher and their research topic. Researchers themselves could be an element of the examined object area (as IT user, consumer, citizen, etc.). Moreover, research referring to the social sciences unintentionally changes its subject matter to a greater extent than in the natural sciences. In order to better assess such effects, the process as well as the results of the investigation needs to be the focus of interest.

The frame of reference also captures the background of the assumptions and hypotheses to interpret the (empirical) results, according to the selected methodological design. This design together with the preliminary data (supporting the research claims or hypothesis) form the basis for the work plan, which needs to be structured according to the research objectives and goals. If expertise is required to justify the method design, work packages, deliverables, and milestones, then respective checking of the initial version of the research question and its underlying frame of reference is advised before starting work. It needs to become part of the learning contract, which can be considered a milestone in the Peffers et al. (2006) framework.

### **Means of support – Cognitive apprenticeship and scaffolding**

This section examines the findings with respect to effective educational means while implementing the design science approach, namely that cognitive apprenticeship and scaffolding are introduced when building capacity in scientific work practice, in particular when specifying a research question.

Cognitive apprenticeship is already an effective means of introducing scientific work to learners. In particular, it creates opportunities to engage learners in scientific practices and motivate them to continue in scientific work (Thompson, Pastorino, Lee, & Lipton, 2016). According to Allan Collins (1991; Collins, Brown, & Newman, 1989; Collins, Brown, & Holum, 1991) it should incorporate several steps:

1. *Modeling*: the presentation of a (handicraft) product with subsequent assignment or presentation of guiding information, e.g. text.
2. *Coaching*: guidance and supervision in the execution of the task.
3. *Scaffolding*: support for the learners by expert(s) in individual steps and withdrawal of the expert from the process (“fading”), adapted to the respective learning situation; support is provided by situating and contextualizing the subject to be acquired.
4. *Articulation*: practicing the learned skills and abilities in various situations and under changed conditions.
5. *Reflection*: comparison and review of the solutions, products, and learner results, including feedback from experts.
6. *Exploration*: autonomous transfer of the learned in new situations and contexts. The acquired knowledge is abstracted adequately that it can be transferred and used without the further assistance of an expert – the learner has become an expert.

Cognitive apprenticeship helps to structure the learning procedures by triggering construction processes, e.g. as language concept comprehension (cf. Gibbons, 2002). Scaffolding works through framing knowledge or information utterance, which is then dismantled once the learners have successfully accomplished the learning tasks or achieved specific learning steps. It can be applied to facilitate individual learner processes as well as group learning. The facilitator plays a crucial role in framing and dismantling the content for the learner.

The facilitator needs to be able to switch between the technical and learner perspective, e.g. being knowledgeable in Business Process Management and guide learners to become knowledgeable in related concepts and methods. Although at a first glance such a process might look like arbitrary flip-flopping, it has an inherent structure:

- The dual role of the facilitator requires the application of one specific role at a time when being approached by a learner with a certain level of knowledge competence.
  - o When approached by a learner with little or no knowledge in the subject at hand, one behavior pattern is applied.
  - o For learners who are familiar with specific concepts the facilitator activates an informed pattern. Depending on the competence level, the facilitator can introduce new concepts and content to qualify a learner for the next level.

# Developing Scientific Work Practice in Business Informatics...

- The facilitator even abandons peer-to-peer interaction, once the basic inputs can be processed by the learner ('fading'). Hence, even the control of the learning process can switch between learner and facilitator or coach.

In setting up research questions we can learn from Gibbon's experience in language learning, since structuring the wording to express situation-sensitive information is also an essential task in research. Hence, the levels of bilingual scaffolding can be regarded as examples for learning to be articulated in scientific work practice. It can be summarized as follows:

1. *Listening* in the language chosen by the learner – the facilitator resonates in the way learners are able to express their knowledge.
2. *Understand* using the language chosen by the learner – the facilitator is capable of constructing feedback and input for further learning tasks in a way the learners are able to understand, as it is constructed in the same way.
3. *Transferring* the learning to the language production of the respective target language – the facilitator introduces the language structure and relevant expression types used in academic discourse. They practice collaboratively until the learners are able to utilize both the structure and the expression types of verbal scientific articulation.
4. *Building up* scientific articulation support as scaffolding – the facilitator provides scaffolds to enable capacity building for research-practice skill development through scientific language expressions.
5. *Marking* the end of facilitation and thus the interaction situation, by reflecting on the process so far and indicating the completeness of task accomplishment.

According to this approach, design science targeted scientific work practice needs to be separated from the learner language capabilities so far – a process that could be termed systematic and criteria-based code-switching, which takes into the account the opportunities and capabilities of the targeted learners at their current stage of develop-

ment. In this way, learners in academic work practice can be guided continuously to an academic form of articulation that uses each of the strengths of one language to build the other.

Based on these findings the suggested scaffolding scheme is composed of several parts. They can be used as a sequence or when needed. As shown in the table the scaffolds refer to:

- the existing situation, representing the frame of reference scoping the planned research;
- problems that needs to be solved, or the potential that is recognized in the situation at hand which has been observed and could be used to change the existing situation;
- future scenarios (or learning outcomes) once changes have been implemented in solving the problem or exploring the potential.

The existing situation (scaffold I) is described as:

- representing the frame of reference scoping the planned research,
- a setting for starting the research activities.

For instance, a research question concerning process management can refer to Knowledge Management and Systems Thinking (cf. Senge, 1990) as contextual ways of dealing with knowledge, ranging from elicitation to processing. The corresponding description of the situation is: "Business Process Management can profit from Knowledge Management and Systems Thinking, as it allows the contextual acquisition, representation, and processing of knowledge." This statement can be made when the existing studies refer to successful intertwining of Business Process Management with Systems Thinking and Knowledge Management methods. It sets the frame of reference by addressing the integrating perspective on the fundamental techniques of Knowledge Management (cf. Dalkir, 2013) with Systems Thinking. This perspective also corresponds to the starting point of research activities in this case.

The problem or potential (scaffold II) is described through the following items:

- problematic elements or behavior patterns that are subject to change,
- enablers that could trigger the change process.

**Table 1. Scaffolds for setting up a research question**

Scaffold	Scaffold Item	Scaffold Example
I – Describe the Existing Situation	Setting the frame of reference Starting point of research	Business Process Management can profit from Knowledge Management and Systems Thinking, as it allows contextual acquisition, representation, and processing of process knowledge.
II – Formulate the Problem or Potential	Problematic elements or behavior Potential change carriers	How do existing approaches to knowledge elicitation enforce Systems Thinking?
III – Capture the Envisioned Situation	Result parameters Change of quality	An informed setting of elicitation facilitates project design.
IV – Label your Project	Self-explanatory and appealing identifier	Contextual Process Knowledge Elicitation

Source: author's own work.

For the sample case involving Knowledge Management and Systems Thinking the potential is expressed in the core question: “How do existing approaches to knowledge elicitation enforce Systems Thinking?” The focus is applied to one of the traditional starting points in Business Process Management projects, namely the acquisition of knowledge. It addresses the already mentioned integrative capacity by issuing the enforcement of integrating Systems Thinking into the process of knowledge elicitation from business processes.

The envisioned situation (scaffold III) is described including:

- parameters manifesting the results of the research,
- qualities that are addressed through change.

Hence, the envisioned scenario addresses changes when being implemented after having explored some potential or solved a problem. In our sample case, the effect is described by “An informed setting of elicitation facilitates project design.” It leaves open the way in which context can be represented, since it refers to the knowledge elicitation setting rather than the methods used. It addresses qualities and result parameters only indirectly, namely through the terms ‘informed’ and ‘facilitates’. When formulating this part of the research question in this way, it is not yet clear which qualities are addressed (for project designs) in what way (allowing result parameters to be specified). This will be clarified when performing the actual research.

Finally, the research question should refer to a project that has a self-explanatory and appealing identifier (scaffold IV). The provided example “Contextual Process Knowledge Elicitation” indicates the quest for eliciting knowledge on processes while recognizing their context.

Each of the scaffolds can be used following the cognitive apprenticeship procedure proposed by Collins:

1. *Modeling*: the facilitator presents a sample piece of research, e.g. a paper about method appropriation in knowledge management with the subsequent assignment and presentation of how to set up a research question.
2. *Coaching*: the facilitator considers whether the learners need guidance and supervision while working on their learning task.
3. *Scaffolding*: the facilitator identifies which step of the setup process a learner is working on and decides whether to intervene with a scaffold. In terms of the scaffolding, the facilitator has to decide whether to select:
  - a) the entire set of scaffolding (I–IV), e.g. to trigger the description of an existing situation if a learner does not know where to start;
  - b) one of scaffolds I–III, depending on the status of the work, in order to address a specific part of the research question;
  - c) two adjacent scaffolds (I & II or II & III), depending on the status of the work, in order to clarify the interplay between specific parts of a research question.

After accompanying individual steps through one or more scaffolds, the facilitator elects to withdraw from the process (‘fading’), depending on the respective learning situation.

4. *Articulation*: the learner starts practicing the learned skills and abilities in different situations and under changed conditions, e.g. addressing problem solving instead of potential exploration.
5. *Reflection*: the facilitator supports the learner’s comparison and review of achievements and provides methodological feedback.
6. *Exploration*: the learner transfers the acquired knowledge into new research situations and contexts autonomously. It needs to be abstracted by the learner so that it can be applied without requiring the guidance of the facilitator.

From these findings we can conclude that social interaction between the learners and the facilitator, peers, and experts needs to be considered an essential part of the learning support processes, and can be framed by educational interventions as suggested above. Hence, the various threads of interactions need to accompany dynamic content management when providing proper digital learning support.

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### Digital Learning Support

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In this section we discuss the technological means supporting cognitive apprenticeship, including scaffolding, when learners are introduced to scientific work practices utilizing the design science approach, and are asked to come up with a valid research question. In the first subsection, we address the respective process support through digital learning features. This is followed by a practical demonstration of how learners can co-create content when asked to set up a research question. We use the experiences from developing the UeberLearn learning support system (Stary & Wachholder, 2016a, 2016b).

For experimenting with digital learning support technology, any system providing dynamic (hyper-media) content management can be used, as long as social interaction forms an inherent part of it or is directly coupled with the content management features. The reason for the coupling, either through respective tagging mechanisms or system architecture, is that the content for the baseline emerges as part of the interactions that occur throughout the learning processes.

### Process

When beginning, research students need to answer the question: What is the problem or opportunity they would like to address? As research is a logical endeavor, becoming acquainted with scientific work practices is a synthesis of an introduction to a field and known literature or existing knowledge. As discussed in the previous section, setting up a research ques-

# Developing Scientific Work Practice in Business Informatics...

tion should contain an introduction in itself, including a description of the situation. The addressed problem or potential needs to be specific to recognize that it is worthy of focus or consideration.

The target should focus on the subject of concern and demonstrate what should be changed and in which way. The latter particularly refers to “how” questions like “How could project designs in Knowledge Management change when enforcing Systems Thinking for knowledge elicitation?” These questions either address particular activities, such as designing Knowledge Management projects, or a set of relations, such as interfacing Knowledge Management elicitation with Systems Thinking. In the following we detail the process from a learner’s perspective, and assign socio-cognitive support features, including scaffolding.

As shown in Figure 3, the learner’s perspective can be decomposed into several phases:

- The *initialization* phase comprises all activities required to begin formulating a research question.
- The *probing* phase comprises all activities to arrive at a valid solution.
- The *consolidation* phase contains all results to be delivered for setting up the research question.

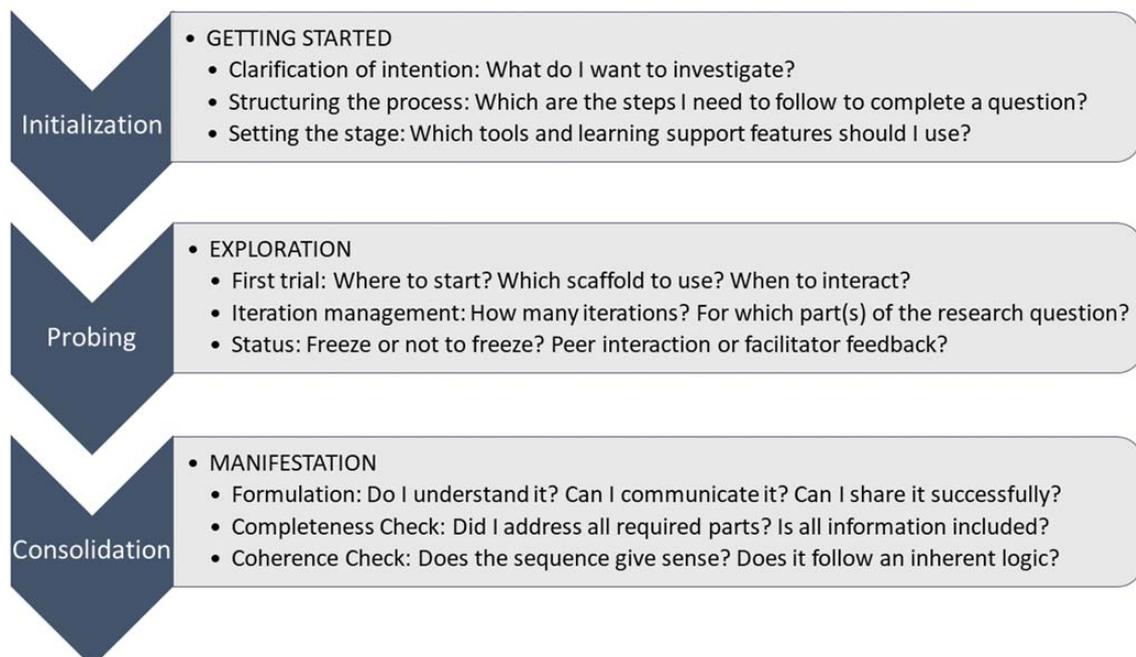
The questions listed in Figure 3 have been collected from facilitators and students of a course in scientific work practice, through storytelling and qualitative content analysis over two terms in 2018/2019. The course addressed scientific topics in Business Engineering and Management and was part of the Business Informatics master curriculum at the Johannes

Kepler University of Linz. Learners are supposed to build scientific capacity in particular, by setting up valid research questions. The course is fundamental as it prepares the Business Informatics students from a methodological perspective for their final master thesis.

The collected data illustrate actual concerns which academic learners confront when asked to specify a valid research question, e.g. before starting an in-depth literature search and excerpting information from scientific material. In Figure 4, (digital) learning support features have been assigned to each of the phases and their activities – see on the right. They will be exemplified in the subsequent sections and represent a minimal set of tools that can be used, through the various learning phases:

- *Note taking*: this feature allows information to be collected and stored for further processing in a structured way. This feature is particularly useful for getting learners started.
- *Content generation*: this enables content creation, e.g. writing a first version of the research question, either to be probed or delivered as the result of an assignment.
- *Interaction*: this feature allows communication threads to be started and followed, in order to clarify issues, to give feedback, or simply to ask questions (similar to Slack.com).
- *Share content*: once content has been created, it can be shared. In the course of the interactions the users and user groups can be selected. In the course of defining it as a baseline for further work, it becomes part of the learning content.

**Figure 3. Learner Process Design for Setting up a Research Question**



Source: author’s own work.

- *Scaffolding*: this feature allows facilitators to make structured interventions when guiding students toward accomplishing the next learning step or assignment task.

As we shall see, from the user-interface perspective the features for notetaking, interaction, and sharing of content have been aligned to facilitate interaction with other learners and the facilitator. The same holds for content generation and scaffolding, as they address domain-specific structures and allow metadata management to be streamlined. In this way, both the usability and user experience can be influenced towards high user acceptance.

**Features**

In this section we examine cognitive apprenticeship while using an existing digital learning support system for individual and group learning processes. It allows not only cognitive aspects to be addressed, e.g. through tagging learning content and knowledge to be acquired, but also social interaction among the participants of the learning processes. Moreover, the platform links the cognitive support features (referring to content and metadata management) directly to the social interactions. The latter allows socially generated content elements to propagate from interaction features to content management.

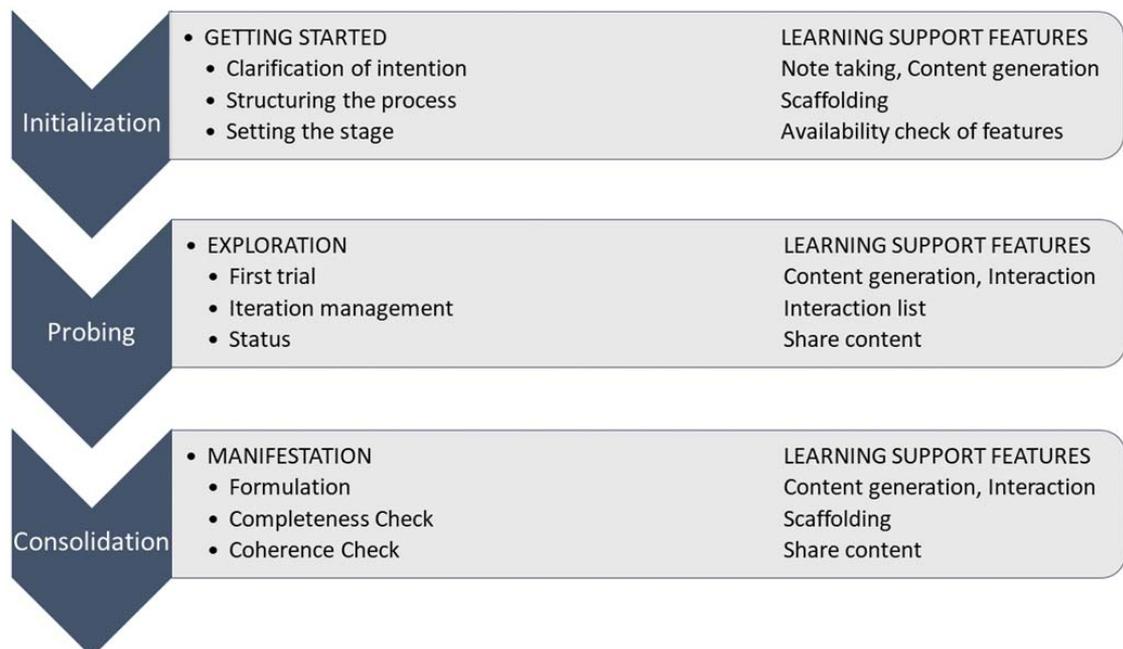
The user interface design of the learning support system is kept minimal to focus on documenting the flow of learning processes while providing relevant content. In the upper right corner, the icons from left to right indicate the main functional areas: note taking and interaction (social medium), study content (learning management), group management (allowing

individual groups to be set up), and basic settings (to individualize the features).

The entry point is a notepad (see center part of Figure 5). It can be understood as an individual notepad, but it can also be used as part of a social medium such as a blog or forum since it forms part of a content repository. Each element of the notepad can be propagated into a group discussion (Figure 6) or into the content of a learning unit or course (Figure 7). Hence, this feature can be used whenever learners or facilitators want to keep something in mind, to ask a question, to start a discussion, to create preliminary content, or to start scaffolding. Learners use it for preserving ideas and inputs received from facilitators, peers, and experts. When setting up a research question, each step, such as Probing, can be mapped to a dedicated thread of notes. These are termed interactions, since they are also supposed to become part of the discussions and feedback cycles.

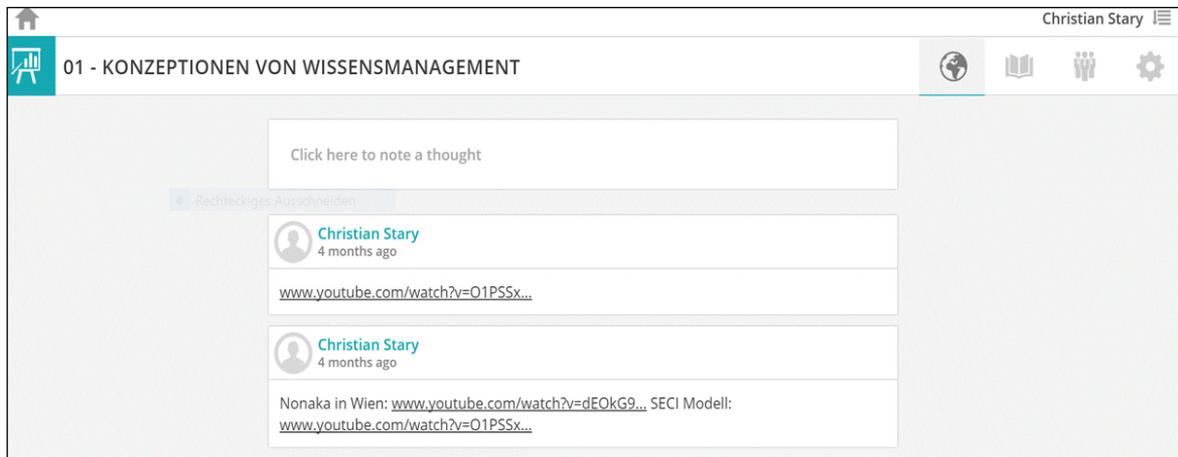
Figure 6 shows a private note example with a list of interactions on the left hand side that can be accessed by the current user as the other users have set them public. Accordingly, the user can switch between their own private notes and public ones. On the right hand side in Figure 6, contacts can be displayed if the current user decides to set a private note public. The current user can select from a list of individual users or user groups, depending on the configuration of the platform and the assigned user privileges. In this way, learners are in control of allowing others to join a conversation on a certain communication thread, such as when preparing a research question.

**Figure 4. (Digital) Learning Support for Setting up a Research Question**



Source: author's own work.

**Figure 5. Notetaking for social interaction and content generation**



Source: author's own work.

The individual handling of interactions is particularly helpful when a learner seeks input from selected peers, as these can be picked from the list of contacts, depending on the (informal) network of the student. The list can be modified at any time, either to enlarge the visibility of interactions, e.g. when a specific thread should be used by additional users, or to restrict access, e.g. when the student has collected all the information required to proceed with their individual task accomplishment.

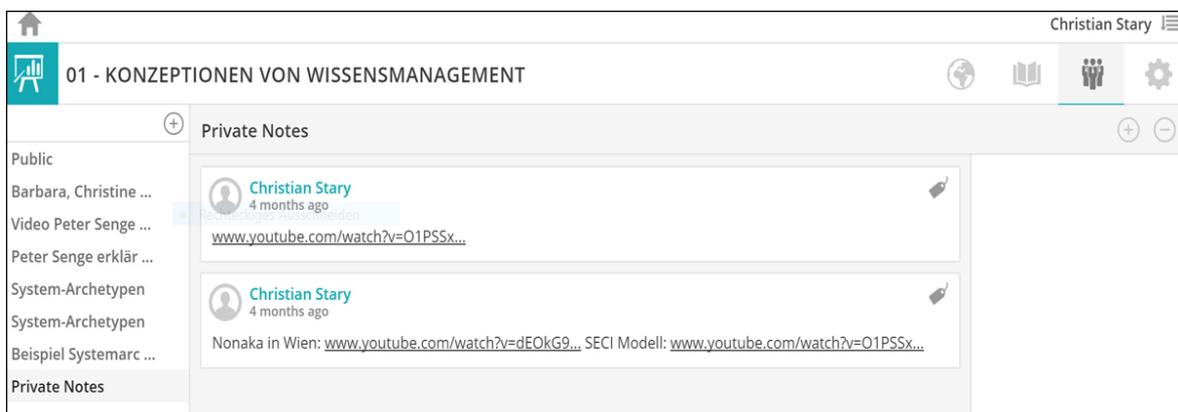
When using scaffolds along interactions, the learners should not recognize their origin as they can be phased in by the facilitators to guide the learner, and direct the next learning step. The flow of interactions should be maintained, and thus not include switching to different threads of interactions or the content management parts of the learning support system. Material, scaffolds, and other (domain) inputs can be edited or imported in a structured way into the learning support system, and are provided to learners when the facilitator decides.

Note taking is one of the features that have been designed for the aligned individual and joint creation

of knowledge. As shown on the left-hand side in Figure 7, content can either be Documents, Resources, or Collected Content. Documents contain tagged content elements, i.e. domain-specific or educationally relevant blocks of information such as background information, scaffolds, examples, explanations, code snippets, and frameworks. Resources are any type of material that can be downloaded for further use, e.g. textbooks, case studies, standard specifications, and assignments. Finally, Collected Content contains material that has been generated dynamically and set public for further use, e.g. intermediate results, completed scaffolds, and additional examples.

Utilizing this 3-part structure in a learning support system enables facilitators to generate and offer self-contained material as part of Resources, e.g. scientific papers that learners need to read and work with. It further enables the pre-structuring of the content that learners generate, such as the research question or, later, the project proposal. It helps learners to follow a certain structure when organizing their data and results. The Documents part also enables facilitators and experts to provide content snippets and tag them,

**Figure 6. Private interactions can be set public**



Source: author's own work.

e.g. defining a research question, or exemplifying the requirements for a solution to a research question. Hence, this part serves as an interactive portfolio and scaffold repository.

For intermediate results and items to be discussed, e.g. when selecting a specific item from various sources, the Collected Content part offers a kind of clipboard functionality. Items can be moved from there to Documents, and thus become “finalized” for further processing. This feature is of crucial importance when learners collaborate with peers and need to conclude on some results to reach a milestone in a research project, in particular completing the research questions (through Manifestation).

The workspace in Figure 7 shows Collected Content with examples of emerging content as part of the sample case intertwining Knowledge Management and Systems Thinking, in order to understand contextual inquiry in Business Process Management. After providing scaffold I in the Document part, students have explored Systems Thinking and created use cases, such as a causal chain diagram according to Senge (1990) in the middle for stationary healthcare. The facilitator released them as illustrative material for all learners. In this way, learners can learn from other use cases and find out whether they have understood the concept of Systems Thinking. The facilitator ensured the correctness of the Collected Content.

Overall, cognitive apprenticeship with scaffolding can be supported as follows:

1. *Modeling*: products with subsequent assignments, presentations of guiding information can be part of Documents, as they have educational value and need to be tagged. Additional material can be provided as part of Resources.

2. *Coaching*: guidance and supervision in the execution of the task can be provided by private peer-to-peer or public interactions, varying from 1:1 interactions to group discussions. However, students have control on setting information public or working privately.
3. *Scaffolding*: both the provision of scaffolds by facilitators or expert(s) in individual steps and the withdrawal of the facilitator/expert from the process (‘fading’), depending on the respective learning situation, can be triggered by composing interactions. A link to Documents or direct inclusion into interactions gives access to scaffolds for students when needed.
4. *Articulation*: practicing the learned skills and abilities in varied situations and under changed conditions can be provided through additional assignments provided in Documents.
5. *Reflection*: comparing and reviewing of solutions, products, and learner results, as well as feedback from experts, can be provided at any point in time. It depends on the learner making information public through interactions.
6. *Exploration*: the autonomous transfer of the learned in new situations and contexts can happen at any point in time. When the learner has become an expert, the privileges are transferred from experts or the facilitator to the learner. Then content in terms of Documents and Resources, as well as Collected Content, can be published at any time.

The facilitator can take private notes when following the public interactions, in order to intervene on a social level through plain interactions, or on the cognitive level through scaffolding, or both. Hence,

Figure 7. Sample collected content

Source: author's own work.

the intervention depends on the learner control, i.e. setting information public through interactions, and the judgment of the facilitator at that point in time whether the learner could benefit from working with a scaffold. Scaffolds can either be tagged as such in the Documents part or be created along facilitation, starting in Interactions and later moved to Collected Content for timely and focused intervention.

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## Current Field Test

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In this section, an ongoing evaluation is reported which should lead to inputs for further developments. The case is driven by research-based education in digital production. Business Informatics students have the opportunity to experiment with production technologies when creating a digital artefact that meets their own interest (cf. Stry, 2015; Kaar & Stry, 2019). The current field test addresses Additive Manufacturing and its embedding in engineering and construction tasks. The setting is structured according to the phases of design science-based research, with a strong focus on the process leading to a set of requirements for a solution. In this case, the solution is a digital artefact that is eventually manufactured by a 3D-printing device. Students can access the digital learning support platform as described above, while being guided by the introduced cognitive apprenticeship support measures.

As preparation, background material for the 3D construction, material science, engineering and production processes is provided for the Documents section (see Figure 7, navigation panel on the left). Additional background information can be made available in the Resources section of the learning support system (see Figure 7, navigation panel on the left), including industry standards and Industry 4.0 frameworks, such as RAMI (cf. Kaar, Frysak, & Stry, 2018). The Collected Content part serves as a container when a research question is applied as a baseline for further project work. To allow a kind of procedural scaffold, three threads of interaction are predefined: Initialization, Probing, and Manifestation. They become active for each student in that sequence after cross-checking the result of the currently active thread with the facilitator.

The overall goal of the research project is to provide learners with a background in digital production and introduce its complexity through experiencing 3D design/printing technologies and corresponding materials. 3D modelling and collaboration in teams also form part of that exercise. The initial trigger of the learning process is that students are asked to design and prototype an object or interactive installation (i.e. artefact) of their choice by means of Additive Manufacturing. Hence, in order to accomplish that task, a 3D printer needs to be used (finally). Students may integrate sensor systems, other digital artefacts and technologies; however, they need to find a balance between structuring the artefact into components that can be produced by a specific 3D printing device, the

material characteristics for each component and its consumption for production, and the available design and production technologies.

Consequently, as part of setting up their research question, the students need to become aware of the interdependencies between artefact, technology, and material. The research question lays the groundwork for the learning contract according to the design science procedure, and it contains the project plan the students need to hand in. It not only has to comprise the project idea and the milestones, but also how they plan to investigate the production and assembly of the different parts after modeling and specifying each component of the artefact.

While working on specifying the research question for their artefact, the students need to understand the basic principles of Additive Manufacturing (processes). In a self-managed way they can study the learning material provided on printing technologies, production materials, process design, and 3D modelling. The students need to be informed on the basics of the various techniques, since each of them requires certain specifications, depending on the selected artefact the students wish to produce. The materials can also differ depending on the used technology. In 3D printing the material can be resins, thermoplastics, powdered material or others. Essential for 3D printing is the awareness of the three dimensions of width, height, and depth, in order to be able to create a model, and the capability of the available printing technologies in terms of what part of the artefact can be printed to which extension.

If the students need to help to grasp the complexity of their research, a scaffold of type I (Describe Existing Situation) helps, as the frame of reference can be conveyed in this way. It contains the steps to consider before an object can or should be printed. Once the student can identify a valid starting point, they might need support in formulating problematic elements forming the core parts of their research project, e.g. components of the artefact, in which case a scaffold of type II (Formulate Problem or Potential) can be provided by the facilitator. This indicates which relations need to be considered for digital production, and can be supplemented by a scaffold of type III (Capture Envisioned Situation) for forecasting success in production. All scaffolds are part of the digital learning support system and are activated by the facilitator when appropriate. They become visible in the interaction part of the active thread, and thus form part of the learner's individual workspace.

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## Conclusion

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In this contribution, academic competence development has been addressed with respect to scientific work practice. The presented concepts focus on developing a research question in the context of the problem-based design science approach. Defining the research objectives and solution requirements has

been facilitated by cognitive apprenticeship, including scaffolding. These educational means have been mapped to the digital learning support features of an intelligent content and media platform, demonstrating its feasibility and applicability.

The learning process is addressed from both a cognitive and a social perspective. The respective support features are grounded in interactions between the participants, either leading to content co-construction, input, or feedback provision. The portfolio-like documentation is part of semantic content management and includes the scaffolds and how to work with them when developing a research question. The use of the platform shows the context-sensitivity of the interactions, content management, and organizing of the learning tasks as major assets.

Future work will focus on empirical studies of various features to better understand co-creation and collaboration among learners (cf. Oppl, 2016). In addition, the use of video annotations will be explored, as they could become part of the interactions to become part of content-relevant threads. Finally, the research work following the specification of a research question is of interest, as the learners utilize the platform features for prototyping, demonstration, and evaluation, as defined by the design science framework. The portfolio structure then needs to capture results from each cycle to meet the identified requirements for a solution.

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## WE RECOMMEND

### Trends in Learning Report 2019 based on the research from the Open University's Institute on Educational Technology.

The report goes in line with the research on innovation in education carried out each year by the Open University. It refers to workplace learning and is aimed at corporate L&D professionals. As stated in the foreword, it is intended to answer the question: How do you know if a trend in organizational learning is worth exploring and adopting?

Each year the researchers from OU IET try to identify important and emerging trends that are having an impact on workplace learning. In 2019 they highlighted five trends, described as follows:

1. Thinking and working out loud

In essence, thinking and working out loud is working in an open, collaborative and visible way. It's all about building connections, sharing in sights and problems and collaborative ways of working.

2. Place-based learning

Context is king with place-based learning. It is about making the link between potentially abstract concepts with actual information and challenges.

3. Action learning

Learning is no longer about a course when you only learn stuff until the end of the course. This is about applying learning, reflecting and applying more learning – you use the information that you've got in an environment that allows you to apply it.

4. Learning with machines

Learning with machines covers several aspects of tech-enabled learning. There's AI and intelligent learning, there's the use of algorithms as a mechanism for instruction and there's humans interacting with robots.

5. Playful learning

Playful learning is about experimentation, exploration and curiosity. It is as much a state of mind and an environment, as an actual medium of play, so while it can be role play and gamification.

The main parts of the report are five sections of the same structure, each corresponding with one trend. It starts with a brief description "About this trend," followed by the answer to the question "What impact is the trend having on workplace learning?" and "The expert view." The section ends with "Tips for L&D" and the "Resources" containing useful links for further reading.

More information at <http://www.open.ac.uk/business/apprenticeships/blog/trends-learning-report-2019>





## Four B-learning Models in Children's Speech-language Therapy

Joanna Jatkowska\*

### Abstract

B-learning is a new tool in children's speech-language pathology, one which has not previously been tested empirically by Polish scholars. Polish speech-language pathology has used information and communication technologies for diagnostic and therapeutic purposes for more than 30 years. Originally, speech-language pathologists in Poland used computer software translated from other languages, but in the 1990s, they began to develop their own programs to accommodate the specificity of the Polish language. The advent of the Internet brought with it speech-language therapy e-learning platforms. The author of this paper created a remote speech-language therapy course concept in 2009, which was used to create the first Polish e-learning platform for children with speech impediments, available at [www.elogo.edu.pl](http://www.elogo.edu.pl). Developed in 2010, it was part of the EU project: "Stworzenie internetowego serwisu E-Logo-Edukacja, opartego na innowacyjnych e-usługach: e-logopedia i e-statystyka" ("Development of the E-Logo-Edukacja online service based on innovative e-services: e-speech therapy and e-statistics"). The platform has been used in the speech-language therapy of children with speech impediments in order to verify if new technologies can help improve articulation. The creator of the concept named it b-learning, and it incorporates online exercises into traditional speech-language therapy. A study conducted between 2011 and 2014 on two 35-person groups (an experimental group and a control group) proved that b-learning can be effective when applied in children's speech-language therapy. This paper demonstrates the effectiveness of four b-learning models. The results obtained proved that the most effective b-learning model involved the concurrent use of traditional speech-language therapy and the e-learning platform.

**Keywords:** speech-language therapy, speech disorders, information and communication technologies, e-learning platform, b-learning, b-learning models

*Using new technologies in education has become commonplace in recent years. Information and communication technologies are used at all stages of education, from pre-school to university, in both formal and informal education, as well as in educational therapy contexts. In this paper, the author demonstrates the use of an e-learning platform in the speech-language therapy of children with speech impediments, aged between 4 and 9 years. The focus of the article is on b-learning, which is why its selected definitions are provided in addition to a brief historical overview of the use of new technologies in Polish speech-language therapy. The author also describes her b-learning research process and the effectiveness of its four models.<sup>1</sup>*

### Definitions of b-learning – a review

B-learning is a new term in Polish literature. It comes from the term *blended learning* (Głowicki, 2004), which implies a combination of methods, and its synonyms include *mixed model* and *resource-based*

*learning*. Maciej Tanaś, the originator of the Polish term *nauczanie komplementarne* (complementary education) considers his proposed term to be the best equivalent to b-learning (Tanaś, 2005), and his opinion is shared by some researchers (Mischke & Stanisławska, 2006; Postek, 2010; Czarkowski, 2012). Others, however, identify an electronic aspect in b-learning, which captures the essence of this type of education (Lorens, 2011; Plebańska, 2011).

According to Jakub Czarkowski (2012):

complementary education is a concept according to which the teaching-learning process should combine in a flexible manner traditional education, with its direct communication, and remote education, which uses the Internet and other media. The essence of complementary education is that it combines these two modes of learning so that the individual elements complement one another. (p. 226)

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<sup>1</sup> The paper is based on the author's doctoral dissertation *B-learning in children's speech-language therapy and diagnosis*.

## Four B-learning Models in Children's Speech-language...

B-learning is frequently considered a type of e-learning, along with synchronous and asynchronous learning and self-education (Lorens, 2011). E-learning and b-learning utilize similar technological solutions: computers, software, platforms and the Internet. However, they differ in how the teaching process and training programs are organized. The role of the teacher is also different, as are the means of motivating students.

The initial premises of combining traditional teaching methods with e-learning, where the student has control over their own education, proved to be insufficient. It was necessary to expand the role of the teacher by creating a new, mixed learning concept (Graham, 2006). It is the position of the teacher as an authority figure which is key to improving the b-learning concept.

Sławomir Postek notes in his article *Od e-learningu do c-learningu... (From e-learning to c-learning...)* that, in the hybrid model, the teacher becomes a guide who "leads the student through the material, helps them organize knowledge and finds the right learning strategy" (Postek, 2010, p. 218). The teacher no longer has to be a source of information and the person responsible for assessing student knowledge. Modern-day educators encourage students to self-assess, teach selected information and how to deal with content overload, as well as to motivate learners to seek innovative solutions. They are trainers rather than sources of knowledge and, thus defined, they can play a key role in the success of b-learning or, to be more specific – c-learning (complementary learning).

In b-learning, students acquire specific knowledge and competences in traditional classes, where they have direct contact with teachers, before continuing their learning on an online platform. B-learning is considered highly effective as teachers "know their on-line course participants and what additional exercises and materials they need, and also have control over individual engagement and offering more options to motivate learners" (Lorens, 2011, pp. 12–13).

Marlena Plebańska (2011) claims that b-learning can be more beneficial than e-learning:

taking into account the specificity of e-learning courses and remote learning, blended learning courses can be considered their most effective form. They combine the benefits of traditional methods and electronic tools, without the flaws and weaknesses of either of these types of learning implemented separately. Blended learning, by effectively combining the complementary benefits of the training methods, makes it possible to optimally educate, maximizes the results obtained in the learning process and renders it easier to execute established development strategies. It combines traditional and modern, electronic methods. (p. 20)

According to Głowicki, in blended learning, the traditional and remote forms of learning synergize with each other, which is highly beneficial to learners, provided that they possess rudimentary media competencies. The author also acknowledges the weaknesses of hybrid learning, which include difficulties with motivating learners to study, various imperfections of digital media and overloading learners with too many interactions, which may limit their creativity (Głowicki, 2004, p. 313). This is why direct contact between the teacher and the learner is so important in b-learning course planning, referred to as F2F (face-to-face) in the relevant literature (Carman, 2002; Sharma & Barrett, 2007, p. 7).

In his article *Dylematy współczesnej edukacji: nauczenie tradycyjne czy zdalne? (Modern education dilemmas: traditional or remote learning?)*, Mischke (2005), in his support of b-learning, emphasizes that it is important to "abandon the myth of the separation between traditional and electronic education. Implementing e-learning (including remote learning) requires far-reaching modernization of the traditional education system, and any serious attempt at modernizing the existing teaching practices inevitably leads to e-learning, most frequently in the form of blended learning" (p. 53).

To sum up the above review of the definitions of b-learning, it is important to emphasize that the combination of information and communication technologies with the traditional influence of the teacher is determined by the school subject in question.

Can it be implemented in speech-language pathology,<sup>2</sup> in particular in the therapy of children with speech disorders? In order to answer this question, it is worth studying the history of new technologies in Polish speech-language pathology and specify what forms b-learning assumes in this field.

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### New technologies in Polish speech-language therapy

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According to Józef Surowaniec (1989, 1996), Polish speech pathologists began to use computers in the 1980s. Originally, foreign software (e.g. *Sokoban*, *Tetris*, *Games for Kids* or *MousePen* by Appoint Inc., which enabled children to draw and write) was adapted to the specificity of the Polish language (Surowaniec, 1991).

In the 1990s, the Institute of Education of the University of Silesia used the *ProEuro* program for corrective exercises in Polish pronunciation, grammar and orthography. The software was originally designed for foreign language learning and consisted of two applications: *ProEuro* and *Euro*. The former was used to create language lessons, record individual sounds, words, expressions or sentences and save them. Its developers emphasized that it could also be used to diagnose children with speech impairments. The latter was used for children's therapy and offered the option to analyze

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<sup>2</sup> The term blended learning was first used in Polish speech-language pathology by Monika Bombol-Lagha and Lech Śliwa in 2012 in relation to training future speech-language therapists.

recordings by comparing the speech of the child with that of the therapist. It was also possible to connect words with their spelling. The developers claimed that using computers for the purpose of speech disorder diagnosis and therapy “should increase the effectiveness of therapy and ensure maximum customization” (Juszczak & Zajac, 1997, pp. 131–133).

Bronisław Siemieniecki, the creator of the Multimedia Teaching Library, described the use of *Sound Recorder* and *Media Player* in pronunciation exercises with children in 1999. He noted that recording, playing back, correcting, listening and differentiating makes it possible to intensify therapy, which yields much greater results. He also emphasized that “the effective use of computers requires taking into account the specificity of the hardware and software on the one hand, and the general rules of traditional speech-language pathology on the other” (Siemieniecki, 1999, p. 12).

Over the years, the possibilities offered by primarily Western software were explored after being adapted to Polish, in particular in working with deaf (Szczepankowski & Lemirowski, 1998) or mute children (Buczyńska, 1999a; Siemieniecki, 1999; Grycman & Smyczek, 2004; Grycman, 2009; Zielińska, 2012).

After exploring foreign software, which was primarily designed in highly developed countries, the Polish speech pathology community began to develop its own programs. The first piece of speech-language therapy software was developed at the Department of Speech-language Pathology and Educational Linguistics of the Pedagogical University of Cracow between 1988 and 1990, as part of a ministerial R&D project. The program, *Logoped*, facilitated speech disorder diagnosis and therapy and consisted of two modules: *LogDgn* (speech-language disorder diagnosis), developed by Barbara Kędzierska and Józef Surowaniec, and *LogTerap*

(speech-language therapy), by Anna Mieszkowska and Józef Surowaniec (Kędzierska, Mieszkowska, Olszyńska & Surowaniec, 1990; Surowaniec, 1995, 1996).

A great many computer programs used in children’s speech disorder therapy were developed between 1988 and 2015, with new ones still being developed. These fall beyond the scope of this article – more information on them can be found in the relevant literature (Buczyńska, 1999b; Gruba, 2004, 2007; Juszczak & Zajac, 1997; Kaczorowska-Bray & Miklaszewska, 2006; Ożdżyński, 2007; Walencik-Topiłko & Miklaszewska, 2000; Walencik-Topiłko & Bąk, 2004; Walencik-Topiłko, 2005; Surowaniec, 1995; Szady, 2012; Szczepankowski & Lemirowski, 1998; Waligóra-Huk, 2015).

The development of the Internet, better access to it and faster connection speeds ushered in a network era of speech-language therapy software, which was now available online. The first Polish speech-language e-learning platform, [www.elogo.edu.pl](http://www.elogo.edu.pl), was launched in 2010.<sup>3</sup> It was soon followed by [www.toker.com.pl](http://www.toker.com.pl), as well as websites such as [www.wymowapolska.pl](http://www.wymowapolska.pl), [www.mimowa.pl](http://www.mimowa.pl), [www.ktotomowi.pl](http://www.ktotomowi.pl), [www.czytampisze.pl](http://www.czytampisze.pl) and [www.e-terapię.pl](http://www.e-terapię.pl). In addition to speech-language therapy platforms and websites, new online speech therapy service networks were developed between 2009 and 2014. Websites such as [www.s-mile.pl](http://www.s-mile.pl), [www.abcpoprawnejwymowy.pl](http://www.abcpoprawnejwymowy.pl), [www.polskilogopeda.com](http://www.polskilogopeda.com) and [www.logopasja.pl](http://www.logopasja.pl) offered access to professional advice and consultations, as well as remote therapy via Skype and Hangouts.

The online speech-language therapy market develops to match the social demand. Many parents seek advice online before consulting a speech-language professional. Table 1 shows search engine data from 2016 and 2018 – an upward trend can be observed.

**Table 1. Google.pl search results from 2016 and 2018**

No.	Searches in google.pl	Number of searches in 2016	Number of searches in 2018
1.	logopedia (speech-language pathology)	1,640,000	15,500,000
2.	logopedia (speech-language pathology)	1,220,000	5,050,000
3.	logopeda online (speech-language pathology online)	393,000	4,720,000
4.	terapia logopedyczna (speech therapy)	297,000	2,230,000
5.	logopedia w internecie (speech therapy online)	290,000	1,510,000
6.	gry logopedyczne (speech therapy games)	264,000	524,000
7.	diagnoza logopedyczna (speech therapy diagnosis)	198,000	307,000
8.	terapia logopedyczna w internecie (speech therapy on the Internet)	128,000	335,000

Source: author’s own work.

<sup>3</sup> In 2010, the author of this article became head of the EU project: “Stworzenie internetowego serwisu E-Logo-Edukacja, opartego na innowacyjnych e-usługach: e-logopedia i e-statystyka” (“Development of the E-Logo-Edukacja online service based on innovative e-services: e-speech therapy and e-statistics”), the purpose of which was to develop Poland’s first e-learning therapy platform for children with speech impediments. More information on how the platform was developed and its research applications can be found in the relevant literature (Jatkowska & Kaszubowski, 2012; Jatkowska & Hennig, 2013; Jatkowska, 2014; Jatkowska, 2018; Jatkowska, 2019).

## Four B-learning Models in Children's Speech-language...

New applications of technology in speech pathology are rarely studied by Polish researchers. Relevant papers on the topic were published in 2002, 2004 and 2015 (Gruba, 2002; Zielińska, 2004; Żuchelkowska, 2015), however, their authors were primarily concerned with using computers and specialized or educational software. No Polish papers on b-learning in speech therapy have been published so far.

### Author's own definition of b-learning

Based on the definitions used in the relevant literature, current applications of information and communication technologies in Polish speech-language pathology and the author's own observations made during the study, the author considers it necessary to provide her own definition of b-learning:

As used in speech-language therapy, b-learning combines two methods: traditional, which involves direct contact of the therapist with the patient, and IT, which uses modern information and communication technologies. Combining these has to be a process planned by the therapist in a way that ensures the two components complement each other and transition from one to the other in a deliberate way until therapeutic success is achieved. (Jatkowska, 2018, p. 131)

### Four models of b-learning

Initial organizational efforts and preliminary pilot studies demonstrated that b-learning was not a uniform process, and that its effectiveness was determined by several factors. These included: the speech disorder in question, the readiness of the child to complete online exercises, the digital literacy of the parents and the latter's involvement in the child's therapy. The task of the therapist was to identify these factors, plan the b-learning process and incorporate it into a traditional speech-language therapy. These preliminary analyses, which involved preparing chil-

dren to participate in b-learning, led to the creation of the four b-learning models.

Model 1 involves concurrent traditional therapy and b-learning, from the preliminary diagnosis and until the final diagnosis. Under this model, the therapist examines the child twice (Figure 1). An important requirement for a child to be treated under this model is being ready to perform in-office and online exercises immediately after the preliminary diagnosis. The child does not require any preparation and completes the b-learning course concurrently with the traditional therapy.

Model 2 involves commencing with traditional therapy and b-learning from the moment a preliminary diagnosis is made. B-learning then finishes with a control diagnosis and only traditional therapy is continued, which finishes with a final diagnosis. A total of three diagnoses are made (Figure 2). Under this model, the child is initially willing to cooperate both in-office and on the platform, though the complexity of their speech impediment necessitates the continuation of the traditional therapy.

Model 3 involves commencing with the traditional therapy from the moment the preliminary diagnosis is made and incorporating b-learning after a control diagnosis. The entire process finishes with a final diagnosis. A total of three diagnoses are made (Figure 3). Under this model, it is necessary to prepare the child to use the platform, which is why only traditional therapy is available initially. After a control diagnosis is made confirming the child's readiness to use the platform, the traditional therapy is continued and combined with b-learning until the entire process is successful. Both parts of the process finish with a final diagnosis.

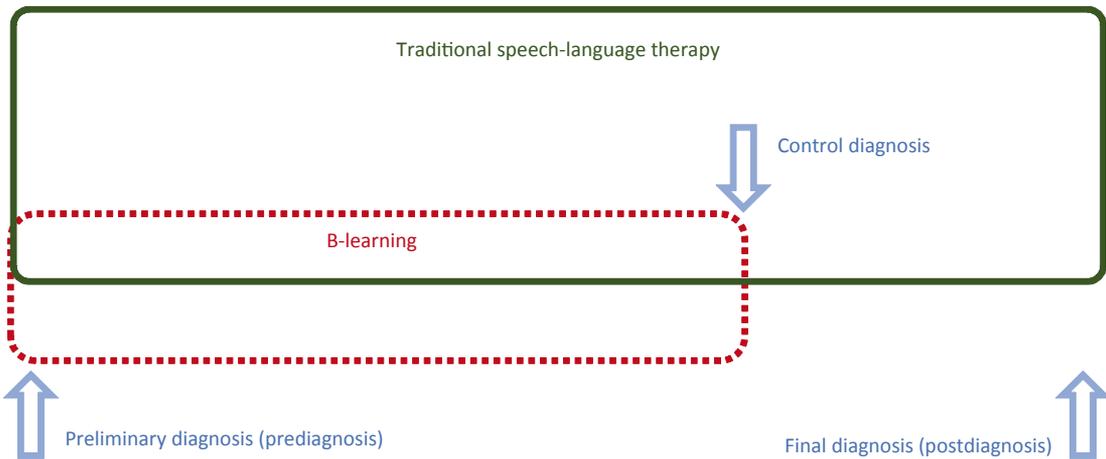
Model 4 involves commencing with the traditional therapy starting from the preliminary diagnosis. B-learning is incorporated during the traditional therapy, and traditional exercises continue after the b-learning part is complete. A total of four diagnoses are made: preliminary, two control diagnoses and a final diagnosis (Figure 4). This model is used for children

Figure 1. B-learning, Model 1



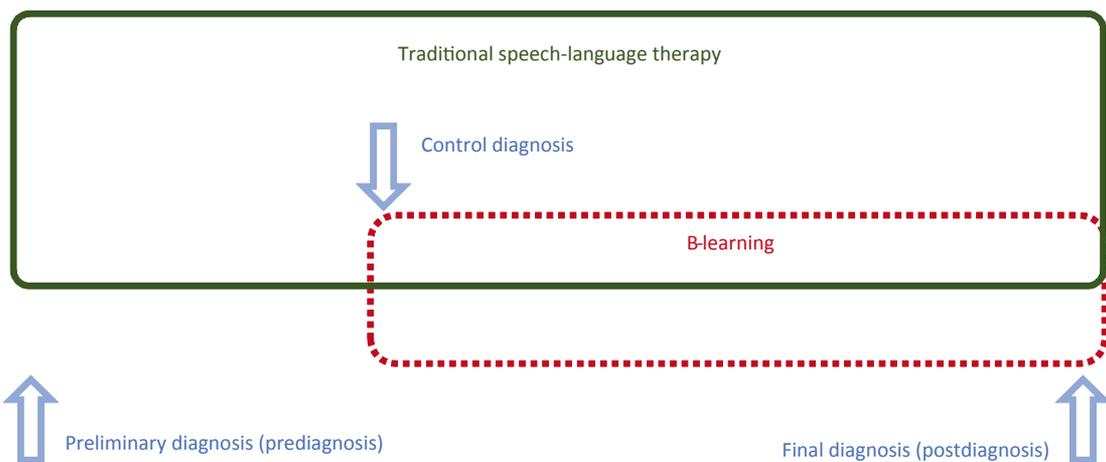
Source: author's own work.

Figure 2. B-learning, Model 2



Source: author's own work.

Figure 3. B-learning, Model 3



Source: author's own work.

Figure 4. B-learning, Model 4



Source: author's own work.

## Four B-learning Models in Children's Speech-language...

with the most severe speech impediments, who not only require preparation to use the platform, but also need to continue with traditional therapy after the b-learning component finishes.

These b-learning models were studied empirically in order to verify which of them was the most effective in children's speech-language therapy. The results of the analyses are presented in the following sections.

### **B-learning research process organization**

The b-learning research process was organized according to the principles of scientific description and comprised two stages: concept and research. The process began with the development of a concept which specified the subject and purpose of the research, as well as the formulation of the research problems and the hypotheses. Research methods and tools were developed, the research area was selected, pilot research was conducted and two groups were selected: experimental and control. This was followed by actual study, after which the data was organized and analyzed using statistical methods (Pilch, 1977). The stages of scientific cognition are shown in Table 2.

**Table 2. Stages of scientific cognition**

Concept stage	
2009–2011	Development of the <a href="http://www.elogo.edu.pl">www.elogo.edu.pl</a> e-learning platform.
2010–2011	Testing of the e-learning platform: training parents, acquiring opinions from subject matter experts, pilot studies and observing children's behavior, development of the b-learning concept and its four models.
2011–2012	Development of educational innovations.
Research stage	
2011–2014	Educational experiment implementation: commencement with the actual study and collection of research material.
2015–2016	Organization, analysis and description of the research material collected.

Source: author's own work.

### **Actual study**

The author conducted an experiment on two groups: experimental and control, between 2011 and 2014. The experimental group originally numbered 52 children, but no suitable control group could be assembled for several reasons:

- 6 children stopped participating in b-learning (mainly due to chronic illness, technical difficulties resulting from a slow Internet connection at home and insufficient computer literacy of the parents),

- no pairs in the control group could be assigned to 11 children due to significant age differences and complex speech impediments, e.g. oligophasia, audiogenic dyslalia, or palatine dysglossia.<sup>4</sup>

Ultimately, each group comprised 35 children (21 boys and 14 girls) with speech disorders (simple and multiple dyslalia, motor alalia<sup>5</sup>). The control group participated exclusively in traditional speech therapy classes at the Tczew Psychological and Pedagogical Counselling Center. The experimental group participated in traditional in-office therapy and e-learning therapy at [www.elogo.edu.pl](http://www.elogo.edu.pl).

Nonprobability and proportionate sampling was used to achieve a representative group. The main factors which influenced the selection process were age and type of speech impediment. The children selected were aged between 4 and 9 years, were all residents of Tczew County and attended the Tczew Psychological and Pedagogical Counselling Center for diagnosis. An important and fixed premise of the experiment was that the children should be treated by a single speech-language pathologist at one counselling center. To avoid heterogeneous therapeutic

influences, such as using different methods or different meeting frequencies, impacting the reliability of the results, the author established all diagnoses and conducted the therapy in both groups personally. The same research tools were used in both groups: parent interview sheets and speech-language evaluation templates, as well as phonemic awareness and motor skill examinations. The stages of the study proper are shown in Table 3.

The main research problem was formulated as follows: is b-learning an effective alternative to traditional children's speech disorder diagnosis and therapy? Six detailed hypotheses were then formulated:<sup>6</sup>

<sup>4</sup> Even though no pairs could be found for those children in the control group, they still participated in the b-learning. This enabled the author to assess which speech impediments were treated particularly effectively using the b-learning method (Jatkowska, 2019).

<sup>5</sup> Kaczmarek's (1977, p. 102) symptomatic classification was used.

<sup>6</sup> A detailed description of the results of the study can be found in the book *B-learning w diagnozie i terapii logopedycznej dzieci* (Jatkowska, 2019).

**Table 3. Stages of the actual study**

No.	Stages of the study	Methods and tools
1.	Selection of children for the experimental and control group.	– observation, observation sheet – interview, parent interview sheet
2.	Preliminary diagnosis of the experimental and control group.	– interview with one parent, parent interview sheet – tests, questionnaires, samples, scales – child examination sheet
3.	Training session for parents: <i>E-learning speech therapy using the elogo.edu.pl platform.</i>	– workshop – presentation
4.	Assignment of individual online accounts to children and commencement with e-lessons.	– individual e-learning online journals
5.	Traditional speech-language therapy in both groups at the counselling center.	– individual speech therapy exercise sheet
6.	Commencement with b-learning in the experimental group.	– individual e-learning online journals – documentation of e-mails exchanged with parents
7.	Control diagnosis of the experimental group.	– child examination sheet
8.	Final diagnosis (postdiagnosis) in the experimental and control groups.	– child examination sheet
9.	Questionnaire study conducted in the experimental group.	– questionnaire, questionnaire form
10.	Experiment summary.	– report – result analysis

Source: author's own work.

1. B-learning expedites traditional speech-language therapy in children with simple and multiple dyslalia.
2. B-learning decreases the number of face-to-face (traditional) sessions for children with simple or multiple dyslalia.
3. B-learning reduces the number of sounds pronounced incorrectly by children.
4. B-learning is particularly effective in treating children with simple and multiple dyslalia.
5. The effectiveness of b-learning is determined by the following factors: age of the child, type of speech impediment, **selection of the appropriate b-learning model**, time spent by the child performing the e-learning exercises and the number of recordings made by the child.
6. B-learning, as a new form of speech-language therapy, increases parent involvement and supports them in conducting exercises at home, primarily by making them more attractive, increasing child motivation and exercise frequency, which translates to higher effectiveness.

For the purpose of this article, only those analysis results are presented which relate to the relationship between the b-learning model used and its effectiveness (hypothesis 5).

### **Effectiveness of b-learning and its models**

The statistical data acquired from the original group of 52 children were used to calculate the effectiveness of the four b-learning models. In order to determine the therapy effectiveness distribution according to the b-learning model used, cross tables and a chi-squared test were used.<sup>7</sup> The results of the analysis demonstrated that the effectiveness of therapy varied significantly according to the b-learning model used –  $\chi^2(9) = 30.18; p < 0.001; \eta = 0.51; V = 0.44$ . The majority of Model 1 and 3 users were children where b-learning proved to be very effective. Based on the  $\eta$  value, it was observed that 51% of the b-learning model variance could be explained through the variance of therapy effectiveness. The relation between these variables was moderate (Table 4, Figure 5).

<sup>7</sup> Pearson's chi-squared test "is also known as the chi-squared test of independence, and its standard version is used to verify if two characteristics are independent of each other. The test involves comparing the identified frequency distribution of a phenomenon with a random distribution of these frequencies. The test can be administered even if the data are collected on a nominal scale" (Francuz & Mackiewicz, 2005, p. 412–413). It is a nonparametric test which verifies the null hypothesis, according to which there is no relationship between any of the variables. A  $\chi^2$  statistic is provided along with the significance level ( $p$ ). If  $p < 0.05$ , the null hypothesis is rejected in favor of the alternative hypothesis, according to which there is a relationship between the variables. In addition, the  $\eta$  (eta) coefficient is given, which is used to measure relationships. It helps assess the extent to which the variance in the independent variable is explained through the dependent variable. Additional coefficients given include  $\phi$  (phi) or  $V$  (Cramer's  $V$ ), which are used to measure the correlation between two qualitative variables measured at the nominal level (<0.3 – weak, 0.3–0.5 – moderate, >0.5 – strong). The  $\phi$  coefficient is used for 2x2 tables, and Cramer's  $V$  is used for larger tables (Francuz & Mackiewicz, 2005).

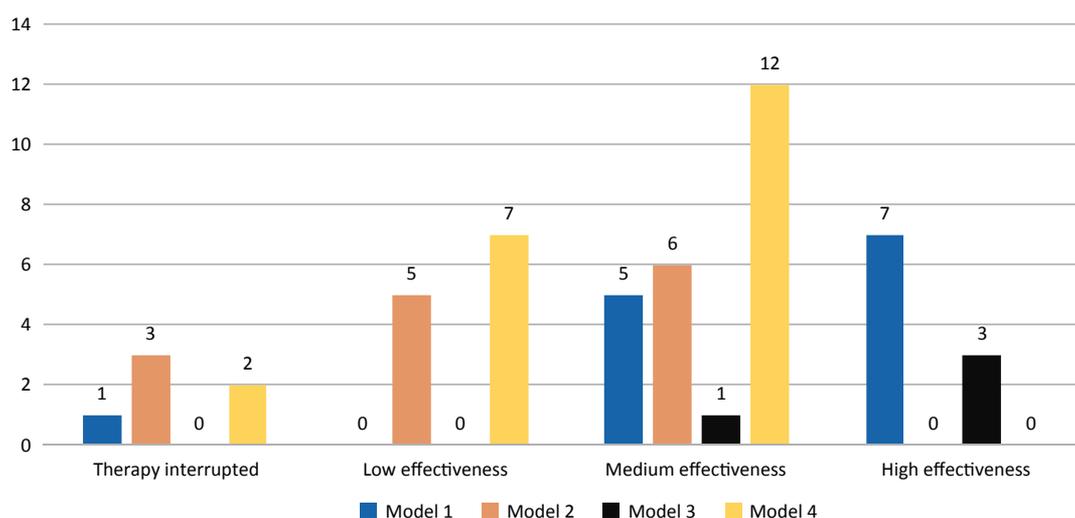
# Four B-learning Models in Children's Speech-language...

**Table 4. Contingency table for the models and effectiveness of b-learning**

			Effectiveness			
			Therapy interrupted	Low effectiveness	Medium effectiveness	High effectiveness
B-learning model	1	Sample size	1	0	5	7
		% of b-learning model	8%	0%	38%	54%
	2	Sample size	3	5	6	0
		% of b-learning model	21%	36%	43%	0%
	3	Sample size	0	0	1	3
		% of b-learning model	0%	0%	25%	75%
	4	Sample size	2	7	12	0
		% of b-learning model	10%	33%	57%	0%

Source: author's own work.

**Figure 5. Therapy effectiveness distribution depending on b-learning model**



Source: author's own work.

The analyses indicate that Model 1, which involved the concurrent application of traditional therapeutic methods and b-learning from the preliminary to final diagnosis, was the most effective b-learning model. Studied under this model were children with less complex impediments, who were ready to perform e-learning exercises from the beginning. The effectiveness of Model 4 was moderate, though the children studied had more severe impediments and their therapy was thus longer. Models 2 and 4 were observed to be the least effective. None of the four b-learning models were observed to be ineffective.

## Summary

The results presented above demonstrate that new technologies can facilitate the development of language ability in children by improving their articulation. Selecting the appropriate therapeutic tool in the form of an e-learning platform, planning the therapy and monitoring the child's activities on

the platform yielded positive results. The majority of successful cases involved children with less severe speech disorders.

It should be noted that the b-learning process implemented was complex and difficult to complete, and involved numerous variables which were beyond the scope of this article.

One of the hypotheses of the article is that "the effectiveness of b-learning is determined by the following factors: age of the child, type of speech impediment, selection of the appropriate b-learning model, time spent by the child performing the e-learning exercises and the number of recordings made by the child." This hypothesis has been partially confirmed. Statistical analyses have shown that only the type of impediment and the selection of the b-learning model determine its effectiveness. However, the age of the child, the time spent performing online exercises and the number of recordings proved to be insignificant to the effectiveness of the b-learning process.

As the appropriate b-learning model was one of the two effective factors out of the many variables, the author decided that this fact should be highlighted in this article.

The analysis of the research material has identified several additional phenomena which accompany b-learning and merit mentioning.

The increased engagement of children in the therapy resulting from the use of a computer and the Internet is not constant. Engagement declines gradually over time as the material is learned, as evidenced by declining log-in rates. Children are capable of remaining engaged in the b-learning process for approximately six months, after which they become fatigued. In order to maintain child engagement, it is recommended to expand the platform's resources to involve new teaching units. This is of particular importance to more severe speech impediments, which require longer therapies. Therefore, speech-language pathology e-learning platforms should offer a wide range of educational materials which therapists can incorporate into long-term therapies.

Another important issue is the workflow organization of e-speech therapists,<sup>8</sup> who work not only in-office, but also on the platform as part of the b-learning process. It was necessary to determine the hours of work and how they are calculated, the location where the new tasks were to be performed and how online activities should be documented. This was and still is a considerable organizational challenge present in all attempts to implement new educational solutions in speech-language pathology, one which requires more consideration and the development of a legal framework.

As mentioned before, b-learning is a new phenomenon in children's speech-language therapy and has not yet been studied empirically. Hence, the author considers this paper to be the beginning of a discussion on the topic, and expresses the hope that more researchers will take interest in the matter.

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The full list of references is available in the online version of the journal.

<sup>8</sup> The term was coined by the author during the development of the speech-language pathology e-learning platform and refers to speech pathologists working remotely, listening to children's recordings, analyzing them and providing feedback for parents (Jatkowska, 2019).

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# The Role of Student Editorial Practice in Journalism Degree Programs



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## Abstract

The article addresses the issue of the meaning of student editorial practice in teaching in journalism degree programs. It aims to discuss theoretical matters related to this kind of extra-formal activity and to present a specific example of how a student press editorial office functions at the University of Szczecin. The author's interest is focused around the benefits that accrue from this kind of student activity regarding the acquisition of knowledge, practical skills and soft competences, as well as shaping attitudes indispensable in their future work in the media.

In the initial theoretical part of the article, the assumptions of modern teaching in journalism programs were discussed with a reference to models of teaching that function in European countries, with the significant role of practical teaching of journalism skills also indicated. The latter part of the article is a specific case study that includes a closer look at the ways of implementing student editorial activities conducted simultaneously with the content of the study program. The analysis covers general assumptions, organization of work in an editorial office, a description of the publishing activity of an editorial office and the issue of student press in the space of the new media. Moreover, an attempt was made to assess the effectiveness of the conducted activities.

In conclusion, the author states that being active in student media may constitute a valuable complement to obligatory student apprenticeships and allow students to perfect their journalism skills on an ongoing basis throughout the course of studies.

**Keywords:** media, journalism, teaching journalists, the press, student press

*The aim of this article is to discuss the significance of student editorial practice in journalism degree programs and to present good practices in this regard based on the example of actions undertaken at the University of Szczecin. The initial part of the article refers to selected theoretical findings in the field of journalism teaching, addresses the issue of journalism theory and practice at a higher education institution and discusses the significance of acting in student media to develop the students' practical skills. The article then examines in detail a number of activities executed as part of the editorial work at the University of Szczecin student journal, Kwadrans Studencki.*

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## Introduction

During the 1990s, journalism degree programs became increasingly popular in Poland (Sobczak, 2016, p. 32). The number of students on these courses began to rise, and in the 2018/2019 academic year, according to the data of Statistics Poland (GUS, 2019), they

formed the third most populous group of students in Poland (11.5% of all students were students of social sciences, journalism and information studies). It thus seems fully justified to examine the issues related to the effective teaching of these courses, particularly methods for teaching practical skills among future media employees. There is an opportunity to pursue such an activity in student editorial practice, which may constitute a valuable means for complementing the degree program. Obviously, student media are not new phenomena, yet they may have specific significance in acquiring competencies among journalism students.

This article addresses the meaning of student editorial practice in journalism study programs and presents a detailed example of good practice in this regard. The article comprises two fundamental parts. The first forms a theoretical background for the issue of how teaching in journalism study programs should be presented. It is assumed here that, due to the

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specificity of work in the media, it is necessary that relevant teaching methods be implemented and, in particular, that possibilities are sought to enable students to have the conditions for the unassisted acquisition of necessary practical skills. There is potential in this regard in terms of student media. The significance of student media in teaching journalists shall be specified with references made primarily to the tradition of the student press. This shall serve as a background for presenting a specific example of this kind of activity, namely the University of Szczecin student journal, *Kwadrans Studencki*, founded in 2016. The starting point for the detailed description of the activities takes the form of a presentation of the general assumptions and motifs of the initiators of the student editorial team. This is followed by a discussion on the organization of work in the editorial office, including the specific sections and their tasks. In the part dedicated to editorial activity, the journal profile and its subject content is presented. It is important not to omit the coexistence of traditional student press and the activity of young people in the space of the new media. The latter, nonetheless, is not considered here to be a threat to the classic form but rather a door to many new possibilities for student journalism activities. In the conclusion, the usefulness of the described activities are evaluated in terms of acquiring knowledge and, most of all, practical skills by future journalists.

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### **Studies on journalism teaching: a review**

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The issue of teaching in journalism study programs has been already undertaken by researchers. Since the 1990s, a scientific dispute has continued on the subject of the profession of journalist in Poland. The key publications in this regard are listed below in chronological order. It is worth quoting at least the findings made by Jane Leftwich Curry, as presented in her work *Poland's Journalists: Professionalism and Politics* (Curry, 1990). A close look at the Polish journalists of the 1980s and the 1990s was also taken by Zbigniew Bajka (1991; 2000). Overview studies on this matter have been published, among others, in *Zeszyty Prasoznawcze*. The following years also resulted in publications by Walery Pisarek (1995), whose studies included journalist qualifications. A compiled work on selected issues in journalism teaching in Poland was published in 1997, with Tadeusz Wallas as the editor (1997). One year later, a review of the most important assumptions related to journalism teaching in Europe was published by Mogens Schmidt (1998). One should also list as significant the work by Teresa Sasińska-Klas (1998) on education in the field of journalism and knowledge about communications in the late 20<sup>th</sup> century. In turn, the issue of professionalism in this vocation was addressed by Jerzy Olędzki (1996). In 2005, a monograph dedicated to the teaching of journalists was published under the title *Teoria, praktyka, etyka. O kształceniu dziennikarzy w Polsce i na świecie*, edited by Anna Siewierska-Chmaj (2005). A view on teaching about the media and social communication

(disciplines of humanities that were new at the time) was also taken by Tomasz Goban-Klas (2008). It is worth mentioning two published papers on the opinions and expectations regarding journalism teaching in Poland, both in the view of students and scientific-teaching circles (Gawroński, Polak, Leonowicz-Bukała, & Kurek, 2009a, 2009b). The year 2010 saw an important publication by Sławomir Gawroński and Rafał Polak, *Dziennikarstwo i komunikacja społeczna – nowe wyzwania. Kierunki zmian w kształceniu w zakresie dziennikarstwa i komunikacji społecznej* (Gawroński & Polak, 2010). The former was also an editor of a volume dedicated to the employment prospects of journalism students on the job market (Gawroński, 2010a). In the following year, the paper *Dydaktyka dziennikarstwa. Opinie i postulaty* was published by the same author (Gawroński, 2011). Whether the profession of journalist constitutes a mission of some kind was discussed by Joanna Taczowska (2012) in her work. A description of a specific case of teaching in a journalism study program at the Institute of Journalism, the Pedagogical University of Krakow, was published by Edward Chudziński (2012). Changes in journalism were tracked by Bogusława Dobek-Ostrowska et al. in their research (including Dobek-Ostrowska, Barczyszyn, & Michel, 2013). Recent years have resulted in, among others, Barbara Sobczak's published work *Kształcenie dziennikarzy. Wyznawania, koncepcje, metody* (2016) and the paper *Zawód dziennikarza w obliczu zmian* by Jacek Sobczak and Ksenia Kakarenko (2017). This brief overview of selected subject literature shows that the issue of teaching in journalism study programs has been analyzed from various viewpoints. It is worth taking a closer look at them with due account of the benefits arising from student editorial practice, first with reference to recent research findings made in this regard.

Student journals have a long tradition, even though as many researchers in this subject have stressed that this phenomenon is omitted generally and its scale unknown (due to the frequent lack of documented source materials) (Zawada, 1977, p. 318). In their collaborative work, they underline the fragmentary nature of their studies due to the lack of complete collections, and the general lack of copies of a given title whose existence is nonetheless mentioned in other sources (Buck, 2018, p. 62). There are also problems with terminology, since student publishing activities are not properly covered by the existing definitions from the field of press studies and require a broader definition (Zawada, 1977, p. 319). In truth, although there should be agreement that student press is not a subject commonly addressed in research, review publications have been developed that consolidate knowledge on student journals issued at Polish universities (cf. Waśkiewicz, 1975; Waśkiewicz, 1977; Buck, 1980; Magowska, 1994; Chudziński, 2011; Gomoliszek, 2011; Zięty, 2015; Buck, 2018). Undoubtedly, student press constitutes one of the significant elements of the life of academic communities, one that co-creates student culture. At present, such student activities are largely being transferred to the virtual space.

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## **The specificity of teaching future journalists**

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The specificity of the profession of a journalist (to which one is being prepared by means of degree programs and specialties presently popular and abundant in the educational offers of higher education facilities) requires a comprehensive approach in terms of teaching.

However, it should be noted in the introduction that, as remarked by media expert, theoretician and journalism practitioner Edward Chudziński:

The profession of journalist in Poland, as in some other countries, is an open vocation. Performing it does not require the completion of a degree in Journalism and Social Communication, which is highly popular nowadays, listed in the offer of several dozen public and non-public higher education facilities, addressed to university candidates. (Chudziński, 2012, p. 334)

The concept of an open vocation is explained also by Joanna Taczkowska, who writes, “it is identified with an absence of substantive legal and formal legal criteria of access to the profession of journalist and the rules of performing this profession” (Taczkowska, 2012, p. 224). In the context of the profession of journalist, the author also recalls terms such as a “liberal profession” (ibid, p. 240) and a “profession of public trust” (ibid, p. 257).

Modern teaching in journalism degree programs in European countries is delivered essentially in accordance with one of two models, distinguished based on the dominant form of how knowledge/skills are transferred:

- Continental (academic) model – focused on transferring general knowledge in a cultural context, with practical skills obtained during professional work;
- Anglo-Saxon (practical) model – focused on the acquisition of practical skills, a teaching vocation in contact with the media (Chudziński, 2012, p. 334; also cf. Schmidt, 1998).

Obviously, these two approaches do not constitute options that are mutually exclusive. Barbara Sobczak wrote:

Therefore, the key importance in curricula is put on the ability to skillfully combine two concurrent paths, the theoretical and the practical. The theoretical path involves lectures with classes that form an apparatus that serves as the educational basis for subsequent levels of learning. [...] The practical path is the students' participation in classes in the editorial offices of journals as well as apprenticeships and internships. (Sobczak, 2016, p. 35)

The optimum solution for teaching in journalism programs is to find a suitable compromise between equipping students with reliable and current knowledge about journalism and transferring to them the practical skills that will allow them to find employment in a selected media editorial team in the future.

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## **Journalism theory and practice at a higher education facility**

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According to students, it is the mastered journalism skills and tools that serve as the basis for their future professional work. This fact is confirmed by, among others, the results of studies conducted among nearly 1500 students of Journalism and Social Communication at nine Polish universities in 2009. As many as 93.5% of the study participants concluded that the most significant element in their future work were the skills obtained as part of journalism workshops (Gawroński, 2010b, p. 14). Hence, students' expectations are often related to proposals that increase the number of classes delivered in the form of workshops. A study on students' expectations regarding journalism degree programs and their professional plans has been conducted, among others, by Iwona Leonowicz-Bukała (2010, pp. 271–288).

Therefore, in the discussion about the assumptions of teaching future media employees, a division of opinion between theory and practice arises; although according to the conclusions of Romana Bartoszcze (2005) “teaching at a higher education institution cannot boil down to merely passing on vocational skills” (p. 75). A professional journalist should have a solid theoretical background in various fields (economics, law, history, etc.) and be well-oriented in the current problems in the area of politics, the social situation, the economy, etc. (cf. e.g. Sobczak, 2016, p. 38). In the case of studying journalism, however, the knowledge acquired during the studies becomes relatively quickly outdated, which is an additional obstacle, as is the necessity for students to acquire new practical skills (e.g. related to the development of new media).

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## **Student media in teaching journalism**

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The common characteristic traits of student media, such as the press, radio, television and websites, include:

- promoting the values and concepts of a specific community,
- non-commercial nature (understood as running a non-profit business),
- autonomy from the state and university authorities,<sup>1</sup>
- engaged journalism (Zięty, 2015, p. 107).

By acting in student media, students have the opportunity to verify in practice on an ongoing basis the

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<sup>1</sup> The autonomous activity of student media is regulated by provisions of law in some countries, such as the USA (cf. Zięty, 2015, pp. 104–106).

knowledge obtained during classes, to acquire new skills and to perfect their journalism skills. Above all, it allows them to master the practical journalism skills of a given medium (i.e. the press, radio, television or the internet) under the supervision of lecturers and often also practicing journalists, media employees. Moreover, they acquire the skill to consciously use various sources of information and to verify their content. Another significant value is mastering the skill of communicating effectively in speaking and writing. Students can also develop the soft competences. Being a member of a student editorial team requires them to demonstrate motivation and commitment, to learn how to act independently and also to acquire team-working skills.

An added value of student participation in editorial practice is also a strengthened bond with the university. In their search for interesting subjects for articles, they diligently follow information about university-related events and eagerly participate in them. Hence, they participate in co-creating the life of the academic community and also undertake actions that affect the image of the university (more on this subject in: Kurek-Ochmańska, 2015).

Student participation in the work of an academic media editorial team is a manifestation of their awareness and willingness to self-improve under academic supervision.

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### Activities in the student journal editorial team

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In the traditional approach, student editorial activities give students the opportunity to learn about press journalism in practice, something that they consider least interesting according to Chudziński (2012, p. 335). During their time spent in a team that develops a student journal, they discover that this form is anything but an anachronism.

Three traditional functions played by student journals can be distinguished:

- a technical (training) function – allowing authors to develop in areas related to journalism,
- an integrative (culture-forming) function – bringing together a group of people who share interests or attitudes, forming a community,
- a representative function – the impact of a journal outside its own environment (after Waśkiewicz, 1975, p. 8).

Among the most significant difficulties related to the functioning of student press is that of the instability of the student environment, which over a period of several years has seen a complete pooling of the staff and its closed social circuit. The view of Andrzej Zawada, published in *Pamiętnik Literacki*, in 1977 still remains valid: “student culture is not focused on self-cognition and description, many of its activities are marked by immediacy, an ad hoc nature, evanescence; it is characterized by substantive dynamism and high volatility of interests” (Zawada, 1977, p. 318).

From a practical point of view, another significant issue is that of financing this kind of student activity. Assuming a professional level of print for the periodicals and the highest possible target print run, the cost is relatively high. Hence, in order to maintain the non-commercial nature of the journal, a plan for funding the activity should be implemented under the editorial team. The financial side of this endeavor requires additional skills from its providers, and thus allows the students to acquire experience in the marketing activities of an editorial team.

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### Student journal at the University of Szczecin: an example of good practice

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#### General assumptions

Students of the undergraduate program in Journalism and Social Communication at the Faculty of Humanities at the University of Szczecin (general academic profile) undertake an apprenticeship amounting to 160 hours (4 weeks). In line with the regulations of the apprenticeship, the primary objective is:

to allow students to observe the work of journalists and editorial teams in various types of media and institutions, participants of public communication, to gradually include the students into their communication activity and thus to gain practical experience regarding the functioning of the Polish communication system within scope determined by the selected place of apprenticeship. (Regulamin praktyk, 2019)

The place of apprenticeship primarily includes editorial teams for the press, radio, television and websites, as well as press offices of various institutions. The apprenticeship may take place after the third study semester.

To a considerable degree, creating additional areas where the students' editorial work can be executed under the supervision of academic teachers is one answer to the demand. Participation in the work of a student media editorial team is a type of extra-formal activity that is important for young people, one having a positive effect on the development of the scientific, cultural or social life of members of the student community at a given university, also allowing it to become better socialized.

In October 2016, Journalism and Social Communication students at the University of Szczecin initiated the founding of the US Journalism Student Scientific Club (US JSSC). At the same time, they undertook actions intended to include students from other faculties of the university in the student club. Having obtained the relevant recommendations from the authorities of the University of Szczecin, the students commenced promotional actions to encourage as many people as possible to participate in the activities of the club. At present, members of the US JSSC include students of philological, humanity, social, economic, biologi-

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cal, legal and theological programs. The author of this paper has been appointed the supervisor of the scientific club.

One of the most important tasks of the US JSSC was to create a general US student journal. The objectives set by the editorial team were to promote the students' scientific and organizational oeuvre and to promote knowledge about initiatives undertaken. The journal was intended by its founders to become a forum where students could exchange views and also form a source of useful information.<sup>2</sup>

The students chose *Kwadrans Studencki* as the title for the journal, to refer in an obvious way to a term that is well known to all university community members, that is, the academic leeway period. This is because this small journal was intended to cover synthetically approached subjects important for this environment, while also allowing the reader to learn quickly about information most important to them.

with external institutions, obtaining sponsors, selling advertising space, accreditation and tickets for events, promoting the journal;

- website section – running the journal website, active management of social media profiles, maintaining contact with readers (e.g. organizing online contests);
- graphics / photography section – preparing photographic material, designing the layout of the journal (i.e. creating the logotype, designing the cover), creating designs for posters, leaflets and other promotional material;
- journal typesetting;
- proofreading of the articles;
- authoring of the articles (people who cooperate on an ongoing, occasional or one-time basis) – suggesting subjects, gathering information, creating texts; authors who cooperate with the journal on an ongoing basis are assigned

**Figure 1. Logotype of a student journal of the University of Szczecin**



Source: designed by Sara Kwiecień.

## Organization of the work of the editorial team

With support from the Sphere of Student Culture of the University of Szczecin, an institution that handles and associates all student organizations operating at the university, the students were able to create the editorial team of the journal from the ground up.

It comprises not only the club members but also other interested individuals from various faculties at the university. The editorial team attempts to divide all tasks related to the publishing of the journal among the students to maximize use of their skills and potential. Students cooperate with the journal editorial team in various areas, such as seeking information, writing texts, creating graphic materials, taking photographs, running websites to promote activities at different events, and marketing.

Various sections were distinguished in the editorial team of *Kwadrans Studencki*, with specific tasks attributed to them:

- management editorial board of the journal – coordinating the publishing process, controlling the timely execution of tasks, budget planning, representing the editorial team at official events;
- promotion and marketing section – cooperating

to relevant sections in line with the subject in which they specialize (e.g. IT section, science section, culture section, music section, sports section).

It should be stressed that one of the important areas in which students can gain experience by working in an editorial team of a student journal is marketing and promotion. This section prepares offers that cover the possibility of publishing advertisements, advertorials, invitations and promotional materials of other types in the journal. This allows the journal to become a self-funded endeavor, and by the effective choice of published advertising material it also promotes student-friendly companies and locations. In turn, for external institutions, it is an opportunity to reach a large number of young people who constitute one of the most active social groups in terms of consumerism.

The fundamental form of work of the editorial team is systematic editorial meetings under academic supervision, where decisions are taken regarding the journal. Their role is invaluable since they provide a substitute for the actual journalist work of an editorial office. Editorial meetings cover in particular:

<sup>2</sup> <http://wf.usz.edu.pl/instytut-polonistyki-kulturoznawstwa/studia-ii-stopnia/#praktyki-zawodowe> and [http://wf.usz.edu.pl/wp-content/uploads/DiKS\\_REGULAMIN-PRAKTYK-ZAWODOWYCH-1.docx](http://wf.usz.edu.pl/wp-content/uploads/DiKS_REGULAMIN-PRAKTYK-ZAWODOWYCH-1.docx)

- planning activities (both current and long-term),
- assigning roles and tasks planned for execution,
- verifying the timely execution of commitments.

At the meetings, the concept of the journal is developed, including its volume and subject-oriented arrangement. Students submit their proposals for subjects of articles, which are discussed in a forum and then a decision is taken jointly on their publication. In agreement with the supervisor of the editorial team, the proper journalistic genre of the text is also determined. The diversity of the proposed subjects and forms is naturally determined by the creativity and commitment of the beginner journalists. Discussions held at meetings of the editorial team regarding current problems of the academic environment allow them to acquire the skills to express their own opinions and interpret facts. Their participation in meetings also allows them to motivate one another.

After each meeting, the students commence the initial work to gather suitable material for publishing, followed by developing the material without assistance, and consulting the journal's editorial team supervisor about the prepared text.

#### **Description of the publishing activity of the editorial team**

In the *Kwadrans Studencki* journal students can share information on scientific interests, publish reports from important events at the university and in the city, or reports from trips that are part of scholarship programs, describe student life in Szczecin, write about their passions, be it art, music, theatre, sports, etc.<sup>3</sup> The following sections were distinguished in the journal: *Podróże kształcą*, *Studenckie życie*, *Na studencką kieszeń*, *W świecie nauki*, *Student z pasją*, *Wykładowca z pasją*, *Ciekawe wydarzenia*, *Krytycznym okiem studenta*, *Strefa rozwoju*, *Strefa kultury*, *Strefa muzyki*, *Strefa sportu*. The scope of the articles covers issues that are significant to the student community. All the created texts are verified by the editorial team supervisor. Before publishing the articles, their authors are required to make appropriate technical, substantive and linguistic corrections.

If they are willing to develop press material that is attractive and complete, the students often have to overcome communication barriers, establish numerous contacts and maintain good relations with representatives of various environments and institutions. It is worth mentioning that contacts with individuals and local institutions acquired in

this way will serve them as invaluable help in their future work as journalists.

As many as five issues of the *Kwadrans Studencki* journal have been published so far. The journal is distributed free of charge by students who belong to the editorial team, across all faculties of the university in places accessible to students (e.g. student houses, libraries and cultural institutions, cafes, places of entertainment).

#### **Student press in the space of the new media**

The content of student journals often migrates to the internet over time. In the case of the *Kwadrans Studencki* journal, the online option is used simultaneously with the traditional publishing activity, owing to which both the student editorial team (i.e. online publishers and social media experts) and the circle of recipients of the created content can be expanded to include new individuals.

Students run the journal website on the university domain [www.kwadrans.usz.edu.pl](http://www.kwadrans.usz.edu.pl) where both current information and the journal in an electronic form (pdf) are published. The journal has a fan page on Facebook and an Instagram profile. Social media serve as a means for the members of the student editorial team to reach students (not only of their alma mater) and also institutions interested in cooperation.

#### **Assessment of the efficiency of activities**

Among the individuals who currently work with the *Kwadrans Studencki* journal are representatives of most faculties of the university and many student organizations (over 30 people in total). It is worth also quoting an opinion of the students participating in the work undertaken by the editorial office:

Creating and publishing the only general university student journal at the University of Szczecin, *Kwadrans Studencki*, is a great challenge for us but also a marvelous adventure! We learn about the work of an editorial office, perfect our skills, gain experience and establish valuable contacts.<sup>4</sup>

We consider the existence of this US student journal highly important for integration and it will make it possible to express that which is in the hearts of us, the students.<sup>5</sup>

Contrary to the popular view that today young people are accustomed to drawing information solely from the internet, the journal published in the traditional form has enjoyed much interest and has been received positively.

<sup>3</sup> The US student journal *Kwadrans Studencki*, issues no. 1–5 (2017–2019), Szczecin: ZAPOL Sobczyk Sp. j.

<sup>4</sup> The opinion was published by students who are members of the editorial team at the journal website: <http://kwadrans.usz.edu.pl/o-nas/> [retrieved on June 14, 2019].

<sup>5</sup> An application for a contest for the most active research club at the University of Szczecin titled *Koncept US* (the document is available in the archives of the journal editorial office).

## Conclusions

When addressing the issue of teaching journalism students, one should draw attention to the meaning of the practical classes that allow them to acquire experience vital in the media job market. The high significance of a student editorial apprenticeship in teaching in journalism programs stems primarily from the way that we learn through actions (Karwala, 2007, p. 8). Creating texts for university periodicals constitutes an introduction to the independent work of a journalist. Students also learn responsibility, since the success of the entire endeavor, i.e. the timely publication of a high-quality journal, is determined by the proper execution of tasks by the specific individuals who undertook the said tasks. Members of the editorial team will thus learn about the meaning of teamwork, as they often have to support each other actively and to motivate their colleagues.

Activity in student media creates the possibility to complement an obligatory student apprenticeship that allows students to improve their journalism skills on an ongoing basis throughout the study period. It should be also stressed that using the possibility of functioning within an editorial team in the course of a degree program is beneficial not only to journalism students. The ability to describe reality and express one's own views seems universal and significant in a range of academic teaching profiles.

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# Born to Code.

## An interview with Olivier Crouzet from School 42 in Paris

Maria Zajac

MZ: It is said that the name of the school originated from the book *The Hitchhiker's Guide to the Galaxy*, in which 42 was the answer to the question of life, the universe, and everything. Does it mean that 42 is the symbolic answer to the contemporary market needs for programmers?

OC: At first, 42 has been actually presented as the answer to what modern education should be. In the era of the digital revolution, every field of the economy has been shaken, and education should not be left apart. We believe that we are one of the possible ways of digital transformation in education. Other ways should also exist; not everyone fits into the same system. Regarding the market needs, we also are a possible answer. Our model is highly scalable and can provide a large number of ICT professionals that are lacking in numerous countries.

MZ: Why is it possible?

OC: Our main strength is our pedagogical model. It has been designed from scratch, without economic constraint, with companies' expectations in mind and previous experiences. Today, we still try to keep our "think out of the box" and agile state of mind to update the model when it is needed. Unfortunately, this is not the case for public education, stuck with the model designed to fit the industrial revolution 150 years ago.

MZ: At School 42, you declare that there no classes, no subjects, and no teachers, but you still call it a school; why?

OC: In France, we just use 42, and everyone knows. With a foreign audience, at the conferences where speech time is limited, using the name School 42 is an easy way to explain what we are. While having more time, we usually present ourselves as a learning experience. Also, your question reflects - from my point of view - the fact that for many people, a school is a place where teachers do their lessons. For me, it is the place where children/students learn. It should always be student-centric. In 42, our students do learn ICT.

And we do have subjects! No teacher, no lessons, but with a learning path built of many subjects which are sets of challenges, growing in difficulty and size.

MZ: Do you think the model applied by School 42 could become a new model of any contemporary school? Is this model replicable to other areas of knowledge or skills?

OC: I strongly believe that our peer-learning model can be adapted to primary schools, high schools, and different areas of knowledge in higher education. I will give you several reasons here. First, we definitively have connections with classic pedagogical models proposed by such researchers like Celestin Freinet, Maria Montessori, Jean Piaget, and Lev Vygotsky. These models have proven their efficiency and mainly did apply to primary school. Also, our learning context fits the latest research in neuroscience about education in general, not only ICT (Olivier Houdé). Finally, because a lot of simulations, sometimes using VR, can be done these days, which encourages the trial-and-error approach. And that is mandatory for our model to be applied: to have a sandbox, to experiment, to try - not necessarily with success, but with no danger nor consequence. That is also possible for chemistry, business, health, and many more. We have already been asked by a prestigious French business school to cooperate with them; unfortunately, we cannot be deeply involved: I'm a geek, just like my students. We need a real specialist in pedagogy to carry out an in-depth analysis of our model, extract the fundamental pillars, and only then be ready to apply it to another topic in collaboration with a field expert on that topic. The main point here is to split between ICT as a learning topic, and ICT as a support for the learning pedagogy.

MZ: You are responsible for pedagogy at School 42. Could you briefly describe what the core of the pedagogical approach applied by 42 is?

OC: Our students are facing software development challenges (called projects). They need to create

## Born to Code. An interview with Olivier Crouzet...

a piece of software. With no teacher, no lecture, no online MOOC, and no knowledge pointed out by the staff, and they need to collect information, filter this information by testing it heavily, and then use it to create or co-create the software requested by the subject of the challenge. That cannot be achieved alone. Collaboration is a crucial element, and that is why our model is called Peer-Learning. Students discuss, explain how they understand the subject, how they think it can be solved. The goal here is to create collective intelligence and find a new hypothesis that no one brought in the first time. When the project is over, the peer-evaluation is done by five other students from the community, using guidelines provided along with the subject. In case of failure, the project is retried. If successful, it unlocks the next project(s) of the curriculum. Also, the student earns experience points to progress through the subsequent levels and to improve their own skills profile. This is part of the gamification of the curriculum. We do have quests, badges, coalition (like houses in Harry Potter). This gaming approach legitimates the try-fail-try-again approach, and geeks do love it! The freedom of pace and path is naturally embedded in the gamification.

MZ: If there are no classes and no teachers, from whom can students learn? Do they have mentors or experts to ask for advice or an explanation, or is it only their peers to learn from? Do they use any paper or electronic handbooks?

OC: They exclusively learn from their peers, and from the information they gather. There is no mentor nor expert nor handbook, for a simple reason: there is no doubt from these three sources. Any student would automatically believe and apply any information told by a referent. We definitely want our students to doubt and test every piece of information they get. In ICT, something true today can be false or obsolete tomorrow. A professional should always forget their ICT knowledge after a project and get it back the next time they need it! This approach makes sense in a world with too much information available. Developing tests and critical thinking regarding what you read is not only useful for ICT but almost everything in your life.

MZ: And how about grading? Do you use any grades? Is it allowed to make a failure?

OC: Grading is done through peer-evaluation. Grades are from 0 to 100. In everyday life, we all are judged by the others. Being evaluated should be natural but also relative. In 42, it is not a unique "superior" human being, but five peers, who are at the same level as you are, and do not necessarily agree on the result of your work. We try to

avoid failure stigmatization and lead our students to a natural and peaceful try again outcome.

MZ: Students at School 42 come from different backgrounds and even different cultures. What makes them collaborate rather than compete?

OC: This is the job of our selection process. 30.000 applicants register online every year for the Paris campus. They do online tests, then 3000 are selected for the Piscine. The Piscine is the second part of the selection. It is a four weeks long immersion in 42. Applicants taste if they do like coding and if they do fit into the peer-learning model. We tell them that to be admitted, they need to collaborate. Isolated applicants do not progress fast enough, and they got stuck very quickly. After a few days, this is very clear for all of them. And diversity is an asset for collective intelligence, not uniformity. People think differently and can bring various points of view.

MZ: Students do not pay any tuition, what happens if someone withdraws from 42 before completing the program?

OC: They just quit the program. We knew from the very beginning, that was going to happen, and our primary donor is entirely OK with that. We also have a dedicated system to exclude students too lazy, with not enough focus on the curriculum. The freedom of pace is enough for a slow student and a student with a part-time job living in Paris, but we ask students with no progress at all to leave their seat for someone else. Also, the surprise of peer-learning comes in the Piscine. Once admitted, you precisely know what to expect for all the curriculum.

MZ: You mentioned that the school has already 18 branches all over the world, and two others are being prepared to be open soon. What do they have in common? Are they all based on the same pedagogy?

OC: All our campuses are 100% clone of Paris. The same conditions apply, the same pedagogy.

MZ: Could you tell a few words about the future plans? Do you plan to open schools in other countries as well?

OC: We do have a lot of demands. Opening new campuses and providing the appropriate support to all of them is rapidly filling up our schedule for the next few years.

MZ: Thank you for the conversation, and good luck with your efforts. Education worldwide does need new ideas and approaches, and 42 definitely seems to be a unique experience and one of the possible answers both to the educational needs of contemporary societies and the labor market.



## Planner–Doer – Self-control and Regular Study

Katarzyna Bentkowska\*

### Abstract

The systematic acquisition of knowledge is an important skill. Nevertheless, students seem to have problems with proper planning of their education and preparing their tasks on time. Referring to behavioral economics, this can be explained with the planner and doer model. This draws attention to the problems with self-control and describes the dilemma caused by internal tension between favorable long-term plans and short-term actions distracting attention from implementation of the former.

The aim of the article was to analyze student activity in e-learning classes. The analysis concerned a group of students regularly performing assigned tasks and the spread of their activities within the given period. It also allowed investigations into whether the time of submitting the task affected its quality and whether systematic work during the semester affected the exam result.

The analysis of student activity in the e-learning classes shows that:

- There was a large group of students regularly submitting tasks, but there was also a group who never prepared any of them.
- The spread of activity over particular days showed that most posts were published on the last two days of the given period.
- There was a relationship between the time of submitting the task and its evaluation – the posts from the final two days received a lower average number of points than those from previous days.
- There was a positive relationship between the ongoing performance of the tasks and the exam results.

The analysis presented here is a preliminary study but shows some trends among the students.

**Keywords:** behavioral economics, planner-doer model, self-control, bounded rationality, systematic learning

*The process of teaching e-learning classes spurred the author to reflect upon how students commit to regular study and on-time assignment submission. When do students complete their assignments? Do they have sufficient self-control to submit them on time? Do they tend to complete them relatively quickly, when they have time available, to avoid problems which may render it more difficult later? Do they wait until the last minute, when it is no longer possible to postpone completing them? Perhaps they never hand in their assignments at all? Naturally, regular study is an important aspect of learning. However, students tend to find it difficult to properly plan their study time, regularly review the material and meet the assignment deadlines. Analyses of this phenomenon can draw upon the insights offered by behavioral economics, which, by combining economics with a psychological approach, attempts to provide a better explanation of how decisions are made. Richard Thaler and Hersh Shefrin's planner-doer model can be of utility in this regard.*

*The purpose of the paper is to analyze the activities of students participating in e-learning courses and to explain them within the context of behavioral economics. The analysis should demonstrate how many students regularly complete their assignments and present the distribution of student activity before deadlines. It should also render it possible to verify if deadlines have an impact on the quality of work and whether regular study over the course of an entire semester translates into better examination results.*

### Behavioral economics – problems with self-control

If the classical economics concept of *homo oeconomicus* were valid, regular studying would not be a problem. Perfectly rational human beings would have no difficulty optimizing their goals, and thus also planning their study sessions and completing their assignments on time.

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However, the *homo oeconomicus* concept has long been criticized (see: Horodecka, 2014; Lindenberg, 1990), with newer theories basing their analyses on subjects which more closely resemble reality. The rationality of real subjects is limited, and they are satisfied with a “good enough” level of achievement. Behavioral economics is an approach to studying the complexity of human actions. Proponents of this framework attempt to return to analyses of the psychological foundations of human behaviors, which featured in the work of the first economists but were then gradually abandoned by the discipline (Sołek, 2010, p. 25). Models which utilize behavioral psychology methods and quasi-rational subjects are more difficult to construct than traditional models based on rational subjects unaffected by emotions (Thaler, 2000, p. 140), but in return offer new ways of assessing their actions and designing socially beneficial institutional solutions.

The 2017 Nobel Prize laureate, Richard Thaler, one of the foremost proponents of behavioral economics, studied scenarios which demonstrate that, in practice, people act in other ways than traditional economics logic would suggest. Based on this research, he perfected his economic analysis by incorporating three psychological traits which impact decision-making: limited rationality, social preferences and lack of self-control (The Royal Swedish Academy of Sciences, 2017, p. 1). The lack of self-control is a key issue within the context of the problem analyzed in this paper.

Thaler notes that even if the subjects successfully utilize the information available to them and devise a proper plan, it is not guaranteed that they will follow it. This is because they always prioritize their current welfare over their welfare at any point in the future (O’Donoghue & Rabin, 1999, p. 126). Thus, they experience self-control problems. For example, while an individual may be aware that saving money is good for dealing with potential financial problems, in practice they never save because they are happier with what they consume now.

The self-control problem was of interest to Aristotle, Adam Smith and, outside of economics, to Sigmund Freud (Thaler & Shefrin, 1981, p. 394). In the 1960s, Walter Mischel conducted that famous marshmallow test, in which children could choose between eating one marshmallow now or waiting and receiving two pieces. This problem arises in various fields whenever a decision can be made which is beneficial to the subject at the time of making, but is detrimental to them in the long term.

Thaler (2018, p. 138) uses the story of Odysseus’s return to Ithaca to explain the self-control problem. Despite all warnings, he wanted to hear the sirens’

song which lured sailors to crash their boats against rocks. His solution was to order his crewmen to plug their ears with beeswax (to cut off all sounds which could distract them from the plan), and have himself tied to the mast, enabling him to listen to the sirens without any negative consequences (he thus chose an engagement strategy by restricting himself to avoid giving in to temptation). The Odysseus problem exemplifies the dilemmas we encounter in real life. We are constantly exposed to short-term temptations which can impact our long-term welfare.

Thaler notes that events which are closer in time receive more of our attention than those which are more remote. Thus, receiving PLN 1000 in a year is seen as less valuable than PLN 1000 today. Traditional economics uses the concept of discounting to describe this phenomenon. In practice, people “overvalue” current consumption (as noted in Strotz, 1956), and experiences which are closer in time seem more engaging. Thus, the events that occur between the present and the near future are discounted more than those that occur in the more remote future. This is referred to as hyperbolic discounting. Thaler (1981) was the first to conduct experiments to explicate this mechanism. These experiments confirmed that people are quicker to discount in shorter timeframes than in the more remote future. In addition, they demonstrated that profits are discounted more than losses, and low results are discounted to a greater degree than high results. This was later confirmed by numerous other studies (more on this topic in Frederick, Loewenstein, & O’Donoghue, 2002). Hyperbolic discounting and short-term temptations can explain many phenomena, such as why individuals want to quit smoking, but delay doing so. Within the context of learning, the prospect of having to take an examination and pass the course is frequently perceived as more remote than the student’s current activities.

### Planner-doer model

Thaler and Shefrin (1981) used the above observations to develop the planner-doer model. The model describes the dilemma which arises because of the tension between plans and actions. Every individual comprises a planner responsible for planning and a doer responsible for making decisions in the present. The approach used in this model refers to the agency relationship – the planner is the principal, and the doer is the agent. The planner makes decisions aimed at achieving long-term happiness, and the doer is responsible for current decision-making and is driven by short-term goals<sup>1</sup>. Internal tensions arise between them, which are difficult to balance. The planner, in attempting to increase the overall utility over the course

<sup>1</sup> A similar classification is used in modern psychology and is supported by neurological research.

of their life, may use willpower to force the doer to refrain from making decisions which are detrimental in the long term. However, this is not easy and incurs mental costs. The consequences of the tensions between the planner and the doer can be mitigated. To that end, it is possible to utilize methods which are analogous to those used to minimize conflicts of interest in agency relations in companies. The principal may use incentives such as motivational remuneration systems or implement certain rules, such as employee conduct rules or supervision procedures.

The two types of helpful tools – incentives and rules – can also be used in the conflict between the planner and the doer. First, the planner operates a system of rewards and punishments which help influence the final decision. Second, the planner may introduce rules which limit the choices available to the doer. The rules can be external (e.g. imposed during a weight-loss vacation) or internal (e.g. avoiding the purchase of confectionery).

Character traits determine how effectively the planner can control the doer, as levels of self-control vary between individuals (The Royal Swedish Academy of Sciences, 2017, p. 12). Thaler (2018, p. 151) notes that, even though the majority of people realize they have self-control issues, they underestimate the extent of these problems. Loewenstein (2005) also refers to this in his description of hot-cold empathy gaps. When not affectively aroused, people cannot reliably predict how they will behave and how their preferences will change in hot states, and the same is true in reverse.

Modern behavioral economics also uses other models which portray the tensions between short and long-term welfare, and which emphasize the self-control issue (e.g. Laibson, 1997; O'Donoghue & Rabin, 1999; Fudenberg & Levine, 2006). Knowledge of self-control problems may be of utility in various disciplines, including those related to solving important social issues such as saving money for retirement (see: Thaler & Sustein, 2009).

### **Self-control problems and regular studying**

The models presented above can help explain why students rarely study regularly, and, in relation to the issue analyzed in this paper, why they so frequently wait so long to familiarize themselves with new e-learning content and complete the related assignments. Although the inner planner knows the advantages of regular study and is aware that it is more beneficial and effective to complete assignments early, the doer may act to postpone this.

O'Donoghue and Rabin (1999, p. 127), in their analysis of saving money for retirement, note that a rational subject would immediately transfer the saved funds to a savings account offering a better interest rate. However, a subject whose self-control is weak may postpone doing so as transferring funds is a burden to them in the present, and the benefits of transferring would be only available at a later time. Thus, the individual acts to incur the “costs” of the transfer in the future. If the individual is unaware of their self-control

problems, they may postpone the transfer indefinitely, believing that they will surely fulfil the promise made to themselves the next day. Similarly, a student who has an assignment to complete may postpone bearing the “cost” of studying to the next day for as long as possible. This is because the cost is incurred immediately while the benefit is delayed.

Loewenstein's hot-cold empathy gap theory (2005) can also be applied to regular study. At the beginning of a semester, students, who are in a cold state, may easily promise themselves that they will study regularly or whenever they have time available. However, when the planned time for study finally comes, they are easily distracted by pleasure, something that they did not predict. What can also happen is that a student, stressed due to impending deadline, resolves to complete their assignment sooner next time, but ultimately forgets about this resolution and abandons the plan.

It is worth analyzing the influence of the planner's tools described by Thaler on motivating the doer to adopt good habits. The planner may inspire a sense of guilt in the doer and thus motivate them to work regularly. However, using willpower requires effort (Thaler, 2018, p. 147). The planner can therefore use punishments and rewards. An example of this is resolving to do something pleasurable after spending a certain amount of time studying. However, the effectiveness of the punishments and rewards tends to be low as they do not eliminate the influence of the doer, who can abandon studying and instead focus on pleasure. The planner may also impose rules which force regular learning, although as long as the rules are internal, they can be abandoned. Only external rules – such as a deadline – cannot be changed. The student is thus ultimately forced to complete their assignments at a certain point due to deadlines – obligation is one of the most important methods of mitigating self-control issues (Laibson, 1997, p. 443).

In practice, in order for students to plan their work properly, it is helpful to divide e-learning lecture materials into several segments, uploaded at regular intervals and setting deadlines for turning in the related assignments. In this way, students are aware of the class schedule at the beginning of the semester and know when they are expected to familiarize themselves with it. However, even in this situation, problems with regular assignment completion can be observed, especially last-minute completion.

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### **Student activity study results**

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The data analyzed in this paper relates to the activities of students during two e-learning courses which form part of full-time (SM) and part-time, weekend (NM) programs taught at the Warsaw School of Economics (SGH), both lasting a single semester. All course participants participated in the study. For both courses, the number of full-time students (N) was 47, and for the part-time program, N was 22. Results which require taking into account different numbers of lectures are presented separately for both types

## Planner–Doer – Self-control and Regular Study

of program. In the remaining cases, the results have been added together. A total of 449 messages were posted by students on the forums during the semester. The participants were aged between 20 and 25 years, with 29 of them being women (including 23 for SM and 6 for NM) and 40 being men (including 24 for SM and 16 for NM).

The student group was not selected randomly, was not representative and the results therefore cannot be extrapolated to the entire student population. The analysis only demonstrates certain patterns occurring in a non-randomly selected group.

During the course, the students were given access to one or two new lectures every two weeks. The full-time program entailed ten lectures, while the part-time program entailed seven. At the end of every lecture, a homework assignment was given in the form of a problem question, which the students were required to answer on the forums. The deadline was 15 days, after which the forums were locked, with each answer being awarded between one and four points. A written examination was administered at the end of the semester. Marks for answers given on the forums constituted up to 40% of the final grade, with the examination constituting the remaining 60%.

The analysis is based on the following premises:

1. A student who posts their answer earlier is better at planning their work – from the perspective of the planner-doer model, their self-control is stronger. Analogously, a student who posts closer to the deadline has weaker self-control.
2. The grades received by students depend on their involvement in writing the answer.

The following matters are analyzed:

1. The number of responses given by students in both lectures during the semester (depending on the type of program) is indicative of how many were able to meet their deadlines, i.e. possessed the necessary self-control.

2. The number of responses given by students on subsequent days during which the forums are open is indicative of the distribution of student activity over time and provide insight into their levels of self-control.
3. The distribution of grades awarded for answers according to their time of submission is indicative of whether the time at which an answer was posted impacts its quality. The grade average for four time periods is analyzed.
4. Verification of the existence of a relation between the number of points obtained for answers during the semester and the number of points scored in the final examination. The Pearson correlation coefficient is used to assess the association. Students who take the examination in the first sitting (56 students) are to be taken into account.

The answers to the final two questions should be indicative of whether better self-control enables the respondents to achieve higher academic results.

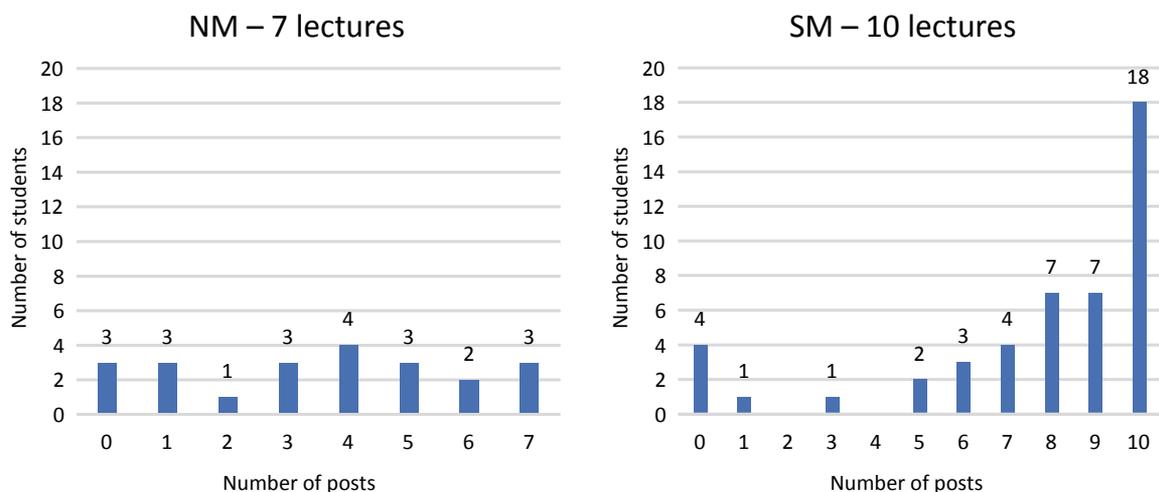
### Regularity of assignment completion

Figure 1 demonstrates the regularity with which the students completed their assignments during the semester.

One group of students completed all of their assignments during the semester. On the other hand, another group never posted any answers on the forums.

The distribution of student activity for the part-time program was relatively even. However, in the full-time group, the largest group (18 students) completed all assignments. Relatively numerous groups (7 students each) completed 8 or 9 assignments. On the other hand, very few students posted between 1 and 4 answers, and as many as four failed to post a single one. This implies a certain kind of consistency in action and that the groups were polarized – divided into those who completed their assignments and those

**Figure 1. Number of students according to the number of answers posted (N for NM = 22; N for SM = 47)**



Source: author's own work.

who completely abandoned them. The study results provide no insight into the matter, but it is possible that those who did not post their answers online had weak self-control, failed to plan their work properly and were unable to complete their assignments in a timely fashion.

The data do not demonstrate that the willingness of students to post their answers changed over the course of the semester, regardless of whether it was the first or tenth lecture, but a similar number of students posted their responses every time.

**Time available for completing assignments**

As has already been mentioned, the students had 15 days to post their responses on the forums after a lecture had been uploaded. Figure 2 demonstrates the distribution of answers over that time period.

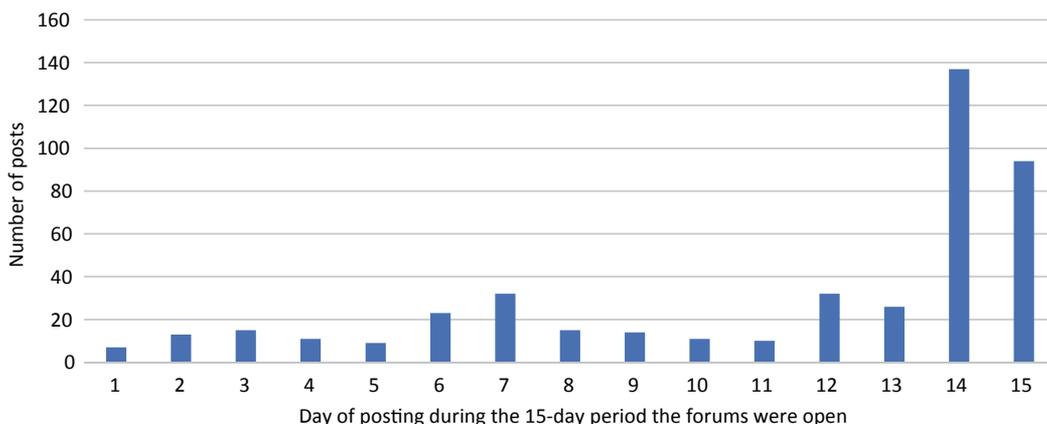
A certain pattern can be observed when analyzing the forum activity of students on individual days after a new lecture was uploaded. When we sum the answers for all lectures, no more than 15 answers per day were given in the first five days. A total of 23 answers were posted on day six, and 32 on day seven

(for all lectures). The lectures were always uploaded on a Monday, i.e. days six and seven were always weekends, when more students had time to complete their assignments. Student activity then declined at the beginning of the second week. The majority of answers were posted on the forums on the second Sunday (a total of 137) and on Monday, the last day of forum availability (94 answers).

When the answers are grouped, we can see that, over the course of the semester, the number of answers posted during the first week was always lower than the sum of answers posted on the penultimate day, and only slightly higher than on the final day before the deadline (Figure 3).

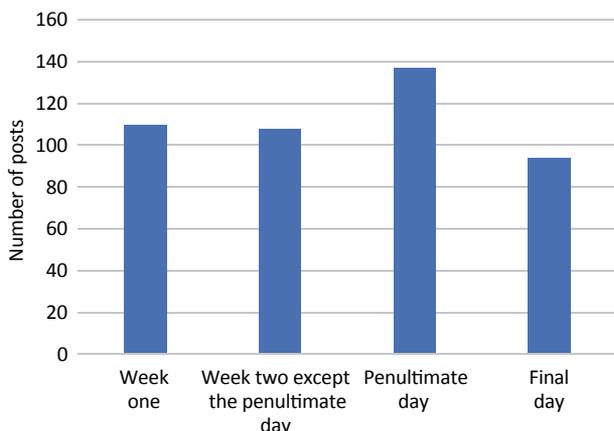
The lower levels of activity in the initial days after the uploads can be explained by the fact that students require time to familiarize themselves with the material before attempting to answer the question. At first, the lack of other answers on the forums may be disincentivizing – some individuals do not like to be the first to respond. It is sometimes easier to post when others have already done so, their answers serving as guidance. On the other hand, the more people who participate in the discussion, the more difficult

**Figure 2. Sum of student answers on different days of forum availability (data for the entire semester) for N = 449**



Source: author’s own work.

**Figure 3. Grouped sums of forum answers posted on various days in the semester, for N = 449**



Source: author’s own work.

it is to provide a unique answer worth a higher amount of points. Postponing until the deadline bears the risk of having to complete an assignment at an inconvenient time for the student. For example, they may be forced not to participate in an interesting, unforeseen activity, or assignment completion may be rendered more difficult by random events, e.g. illness.

It can thus be estimated that, if the students made an effort to regularly complete their assignments motivated by their best interest, the majority of the answers would be posted in the middle of the period. By then, the majority of the students should have had enough time to complete their assignment, without experiencing the stress of doing so directly before the deadline. However, the above data demonstrate that the distribution of student activity does not match this reasoning.

## Quality of answers

Further analysis can demonstrate that the time available for completing an assignment translates into its quality, measured by the number of points scored (Figure 4).

The answers were divided into four groups: those posted in the first week, in the second week except the penultimate day, on the penultimate day and on the final day. Fewer answers posted on the penultimate and final day received the maximum amount of 4 points compared to the other two groups. The average number of points scored by each group are as follows: 3.81; 3.82; 3.64 and 3.52, respectively. An ANOVA test was conducted to verify the significance of the differences. For  $p = 0.05$ , the calculated test statistic value was within the critical range of  $[2.29; \infty]$ . It follows that the scores achieved vary significantly according to the date of posting. It should also be noted that, even though it is not reflected in

the points scored, the author believes that exceptional answers that were significantly better than the others were never posted on the last two days. This may be a result of having less time to answer a question or the lower engagement of those students who delayed posting their solution.

The data from the study are insufficient to assess whether students fail to familiarize themselves with the material well enough when completing assignments near the end of the deadline. However, it is valid to assume that the likelihood of doing so only cursorily and ineffectively is higher compared to situations where more time is available before the deadline.

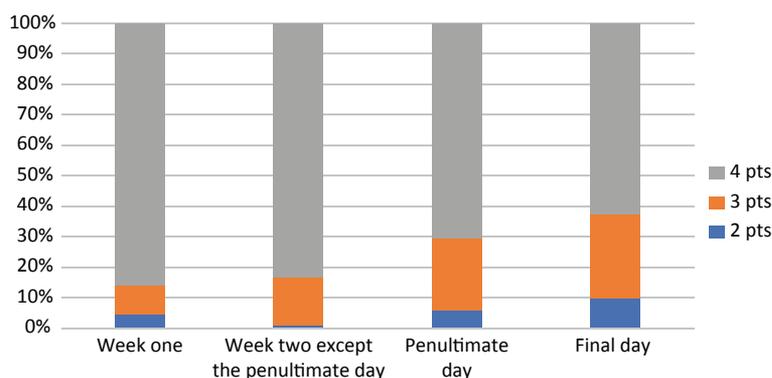
## Involvement in providing answers on the forums and examination results

The purpose of the final part of the analysis is to verify if there is any correlation between the level of involvement in posting on the forums and the knowledge acquired by participating in the course. This is illustrated by verifying the relation between the total number of points acquired by students for forum answers and the number of points scored in the examination (Figure 5). Both variables are given as percentage values. A total of 56 students took the examination at the first sitting.

The Pearson correlation coefficient ( $N=56$ ,  $p=0.001$ ) is 0.60. The value is higher than the table value (0.51), which means that there is a statistically significant relationship between the variables. Students who acquired a high amount of points for posting frequently also received a high amount of points in the examination. Among the students who received the maximum amount of points for their forum posts, only one scored lower than 80% in the examination. On the other hand, among those who received less than 50% of the maximum amount of points for their forum posts, only one person scored higher than 80% in the exam.

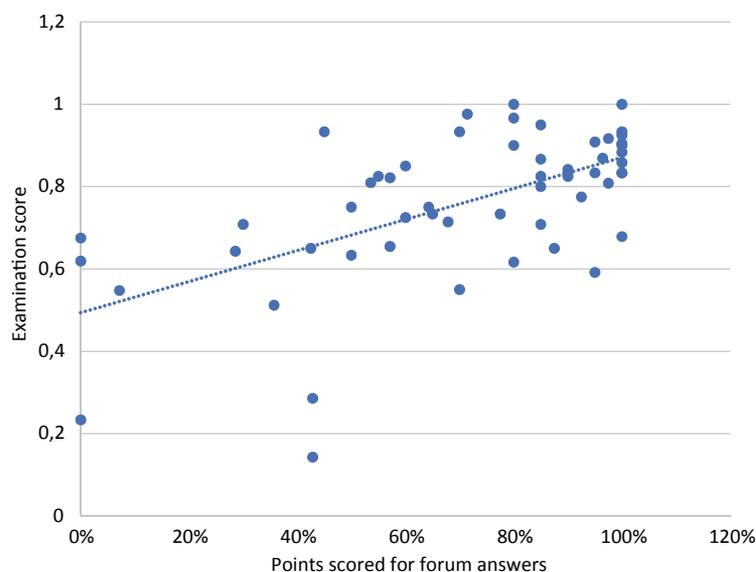
Thus, regular study, which means better self-control, helps achieve higher scores, though this may also be related to the fact that students who study regularly also spend more time preparing for exams.

**Figure 4. Distribution of points scored for answers according to date of posting for N = 449**



Source: author's own work.

**Figure 5. Number of points scored for answers and the number of points scored in the examination (percentage value) for N = 56**



Source: author's own work.

## Summary

Behavioral economics form an interesting basis for analyzing matters related to regular study. The planner-doer model used in this paper renders it possible to explicate problems with regular study and timely assignment completion by linking them to self-control and a greater focus on short-term pleasures than on long-term welfare.

The analysis of the activity of students participating in e-learning courses demonstrated that the highest number of students who completed every assignment (18 students) were enrolled in the full-time program. Two groups of 7 students each completed 8 and 9 assignments, i.e. nearly all assignments required by the syllabus. From the perspective of the planner-doer model, it can be assumed that a large number of students acted under the influence of the planner and pursued their long-term interests, i.e. completed tasks which influenced their final grade. The distribution of student activity on individual days shows that slightly more answers were posted at the weekends, when students most likely had more time, but the overwhelming majority of answers were posted on the penultimate and final day before the deadline. This can be explained by the inner doer delaying task completion as much as possible, motivating the student to complete the task only when postponing is no longer an option. The high number of answers posted on the forums very close to the deadline demonstrates that the most effective solution to resolve Thaler's planner-doer conflict is an external rule – in this case, an answer submission deadline. This offers an important insight for teachers – students can be motivated to study and complete assignments by setting deadlines.

The quality of answers varied according to the date of posting. The average score for answers posted on the penultimate and final day before the deadline was lower than in the case of answers posted earlier.

Using the Pearson correlation coefficient, a statistically significant relation was identified between the number of points scored for forum posts and the number of points scored in the examination. Students who were more involved achieved higher scores in the exam, their stronger self-control allowing them to achieve better grades.

The analysis presented in this paper constitutes a preliminary study. Due to the limited research material and non-random sampling, the group studied cannot be considered representative, and the results cannot be extrapolated to the entire student population. However, certain trends can be observed among students, and it is worth repeating the analysis on

a larger sample. Further research can focus on providing a more detailed explanation of the causes of the observed phenomena, which could help determine a more effective method of facilitating regular study.

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# Elo Rating Algorithm for the Purpose of Measuring Task Difficulty in Online Learning Environments



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## Abstract

The Elo rating algorithm, developed for the purpose of measuring player strength in chess tournaments, has also found application in the context of educational research and has been used for the purpose of measuring both learner ability and task difficulty. The quality of the estimations performed by the Elo rating algorithm has already been subject to research, and has been shown to deliver accurate estimations in both low and high-stake testing situations. However, little is known about the performance of the Elo algorithm in the context of learning environments where multiple attempts are allowed, feedback is provided, and the learning process spans several weeks or even months. This study develops the topic of Elo algorithm use in an educational context and examines its performance on real data from an online learning environment where multiple attempts were allowed, and feedback was provided after each attempt. Its performance in terms of stability of the estimation results in two analyzed periods for two groups of learners with different initial levels of knowledge are compared with alternative difficulty estimation methods: proportion correct and learner feedback. According to the results, the Elo rating algorithm outperforms both proportion correct and learning feedback. It delivers stable difficulty estimations, with correlations in the range 0.87–0.92 for the group of beginners and 0.72–0.84 for the group of experienced learners.

**Keywords:** Elo, rating algorithm, task difficulty, online learning environment, learner feedback, proportion correct

*There are several methods of estimating task difficulty and several possible applications of them. The process of knowledge testing may be shortened by dynamically selecting tasks according to the learner's ability. There is a whole research area of Computerized Adaptive Testing (CAT) with multiple models developed to shorten the process of knowledge assessment. There are also other possible applications, e.g., within online learning environments, to adjust the difficulty of consecutive items presented to the learner. The aim is to deliver items that are not too difficult, as it may cause learner's frustration. On the other hand, if the task is too easy, the motivation of learners may decrease.*

*There are several Item Response Theory (IRT) models used within the CAT area. However, the need for calibration of item banks, computational requirements, and complex implementation make their application within online learning environments problematic. Therefore, alternative methods of task difficulty estimation are evaluated, e.g., rating algorithms originally developed and implemented in other fields. The usage of the Elo*

*rating algorithm has already found examples within the educational context, and this research is the authors' contribution to that field.*

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## Measuring task difficulty

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The problem of estimating task difficulty within an educational context refers not only to the summative assessment (Wauters, Desmet, & Van den Noortgate, 2012), but is increasingly present in the context of online learning environments with formative assessment approaches (Chen, Lee, & Chen, 2005; Klinkenberg, Straatemeier, & van der Maas, 2011; Kortemeyer, 2014; Pelánek, Papoušek, Řihák, Stanislav, & Nižnan, 2017). In the context of knowledge testing (summative assessment), several models have been developed for the purpose of Computerized Adaptive Testing (CAT), assessing the problem of task difficulty and learner ability. The Item Response Models (IRT) of CAT have been used for adaptive item sequencing with the main

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aim of shortening the process of knowledge testing (de Ayala, 2008; Veldkamp & Sluijter, 2019). On the other hand, online learning environments utilize the formative assessment approach and are focused rather on providing feedback than on knowledge testing. The increasing popularity of online learning platforms encourages the introduction of new learning concepts, and these environments may benefit from adaptive item sequencing (Wauters, Desmet, & Van den Noortgate, 2010). The platforms may utilize models for estimating task difficulty, adaptively delivering personalized learning content dependent on the learner's current ability.

Several aspects increase the difficulty of implementing IRT models developed for the purpose of adaptive knowledge testing in the context of online learning platforms. The main assumption of these models is that the skill level of the learner is a constant, as measured at a certain moment of time. Another issue is related to the computational requirements of IRT models. With the growing amount of task response data, satisfying the requirements of recalculation task difficulty and learner ability becomes impossible in real time. Simulation studies (Verschoor, Berger, Moser, & Kleintjes, 2019) have been performed on a database consisting of 300 tasks. According to the study, the response time increases to 2 seconds for 20 observations per task and to 140 seconds for 200 observations per task. However, both these issues are in contradiction to the requirements of online learning environments, where it is expected that knowledge level develops over time, and the updating of estimations for both task difficulty and learner ability is provided on-the-fly.

Several methods of difficulty estimation (Klinkenberg et al., 2011; Wauters et al., 2012; Pelánek et al., 2017; Morrison, 2019) have already been examined as an alternative to IRT models to meet the requirements of online learning platforms and to satisfy the on-the-fly calibration requirements of these platforms. It has been found that rating algorithms, e.g. Elo (Elo, 1978) or Glicko (Glickman, 2001) may deliver difficulty estimations of acceptable accuracy (Pelánek et al., 2017), with lower computational requirements and simpler implementation.

Rating algorithms have been implemented in several online learning platforms for the purpose of estimating task difficulty, with examples of simple multiple-choice or open-ended tasks in the areas of mathematics (Klinkenberg et al., 2011), geography (Pelánek et al., 2017) and foreign languages (Wauters et al., 2012). The simplicity of the task types results from the fact that solving a mathematical task requires the entry of the correctly calculated number (Klinkenberg et al., 2011). Testing the knowledge of geography facts requires the entry of the correct name of a country or capital (Pelánek et al., 2017).

This study introduces the problem of solving very complex assignments: programming tasks. The complexity of the programming task results from the necessity to write the lines of programming code

defining the algorithm that solves a given problem. The learner uploads the created code to the platform and receives feedback on the prepared solution. Multiple attempts are allowed, which should encourage the uploading of improved versions of the code if the previous submission was incorrect.

Online learning environments for a broader audience may benefit from the implementation of methods for evaluating task difficulty and utilizing the estimations in order to adaptively deliver consecutive items. However, the introduction of these methods in smaller e-learning courses across the educational system may also be beneficial. It may provide an insightful overview of the course content difficulty levels and help in better understanding the deficiencies in student knowledge. The involvement of complex methods such as IRT models is a challenge due to the implementation requirements and high computational demands. Therefore, methods delivering accurate estimations where the implementation requirements are lower are attracting the attention of researchers and are a subject for this discussion.

This article presents the approach of utilizing the Elo rating algorithm in the context of an online learning environment, where multiple attempts are allowed, feedback is provided after each attempt and the assignment is demanding: programming tasks, requiring the learner to write code containing algorithms to solve problems of varying difficulties. It can be seen that the Elo rating algorithm provides consistent estimations of task difficulty in the compared learning periods for both groups of learners: beginners and experienced. Additionally, it can be seen that the certainty of estimations increases for all the analyzed methods if the reliability of the assignment to the group according to the level of knowledge increases.

### **Elo rating algorithm**

The aim of the Elo rating algorithm (Elo, 1978) is to estimate a player's strength in two-player tournament games. It was developed to be implemented within chess tournaments and has since been adopted by many other sports organizations, e.g. hockey, table tennis and basketball. It has also found implementations in the context of online learning environments and has proved to be useful in estimating both task difficulty and learner ability (Klinkenberg et al., 2011; Wauters et al., 2012; Pelánek et al., 2017). According to the research, the estimations delivered by the Elo rating algorithm are accurate enough for operational use within online learning environments. Additionally, implementation requirements and computational demands are low, allowing it to be used as an on-the-fly solution in environments with large numbers of system users and available assignments (Verschoor et al., 2019).

The rating of learners in an online environment is calculated based on the assignment submission outcomes. It is subject to change after every submission.

# Elo Rating Algorithm for the Purpose of Measuring Task...

The formula for calculating a new ranking is as follows:

$$R_n = R + K(O - P) \quad (1)$$

Where:  $R_n$  is the new value of the rating,  $R$  – the actual rating,  $O$  – submission outcome (1 – fully correct response, 0 – incorrect response),  $P$  – probability of submitting the fully correct response and constant  $K$  – the optimal value, which is subject to calculations, and for chess tournaments the value is often 32.

The probability of submitting fully correct response  $P$  for a learner is calculated with the following formula:

$$P = \frac{1}{1 + 10^{\frac{R_o - R_p}{400}}} \quad (2)$$

Where  $R_p$  is the rating for a learner and  $R_o$  is the rating for the assignment.

There have been several extensions to the Elo rating algorithm proposed in the literature. Several studies have utilized the basic version of the algorithm and have evaluated the  $K$  value experimentally (Wauters et al., 2012; Antal, 2013). However, there are other approaches, e.g. calculating the  $K$  value depending on the number of assignments solved by a learner (Papoušek, Pelánek, & Stanislav, 2014; Wauters, Desmet, & Van den Noortgate, 2011).

In order to perform calculations with the Elo rating algorithm, the input data consists of the list of all attempts recorded by the system containing the following columns: 1) learner, 2) task, 3) round and 4) score. The order of the games in the table reflects the consecutive order of attempts recorded by the system.

The *learner* column contains the learner ID and the *task* column denotes the ID of the task in the system. Possible values of the *score* column are: 1 – the learner solves the task completely (win) and 0 – the learner fails to solve the task (lose). The involvement of the round parameter is reasonable in situations where multiple tournaments may be divided by periods of inactivity. In the context of the learning environment, all submissions are considered to occur within one tournament (Wauters et al., 2012; Pelánek et al., 2017) and this study also utilizes this approach.

## Proportion correct

Proportion correct (PC) is a simple measure, calculated as the number of correct attempts on task divided by the total number of attempts on the assignment.

The difficulty of the  $i$ -th task is therefore calculated as:

$$\hat{b}_i = 1 - \frac{n_i}{N_i} \quad (3)$$

Where  $n_i$  is the number of correct attempts and  $N_i$  the number of total attempts on the  $i$ -th task. The greater

the number of correct attempts achieved on the task in total, the lower the difficulty of that task.

According to Wauters et al. (2012), PC may generate accurate estimations if administered to 200–250 learners. The accuracy of the method is very high according to several studies (Wauters et al., 2012; Antal, 2013; Morrison, 2019).

## Learner feedback

Learner feedback (LF) is another simple measure, based on the concept of crowdsourcing or collaborative voting. Difficulty estimations are based on learner estimation of difficulty. Learners judge the assignment on the rating scale and the difficulty estimation  $\bar{x}$  is the mean of  $n$  collected responses  $x_i$  calculated for each task, as:

$$\bar{x} = \frac{1}{n} \sum_{i=0}^n x_i \quad (4)$$

For the purpose of the present analysis, the learners rated the difficulty of assignments on the 5-point Likert scale in the range: 1 – very easy task, 5 – very difficult task. The learners were not obliged to rate the tasks, their responses were optional. Additionally, no attempt on the task was required prior to rating the task, and the learners could rate the task anytime, even without a trial.

Obtaining accurate estimations based on LF depends on the number of collected responses from the learners (Chen et al., 2005; Wauters et al., 2012). The accuracy of the difficulty estimations performed by LF increases with the number of learners willing to share their opinion on task difficulty. However, collecting a sufficient number of responses is an organizational problem and for most online courses with smaller numbers of learners this may take some time. If the responses are collected from a sufficient number of learners, the method provides high accuracy in the estimations (Wauters et al., 2012). The number of collected learner responses collected in terms of this study, broken down into modules, is presented in Table 1.

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## Methodology

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This section presents specific issues related to the construction of the study, the process of data gathering and the implementation of the utilized algorithm, i.e. the online learning environment, the complexity of the programming task utilized for the study and details related to the groups compared within the analysis.

## Data

The data was collected during a programming course taught at the Faculty of Applied Informatics and Econometrics at the Warsaw University of Life Sciences. It encompassed two periods: P1 was the winter semester 2017/2018 and P2 the winter semester 2018/2019. First semester students at the faculty

take the mandatory course of Programming Fundamentals and learn the basic concepts of programming languages in a traditional way, with the support of a university Moodle e-learning platform, where the main course material is available.

Additionally, the students were provided with access to the *RunCode* online learning environment, an internet application available at [runcodeapp.com](http://runcodeapp.com). Use of the additional online learning environment was optional and was not graded; however, the majority of the students decided to use the platform on a regular basis.

The data set contains information about 237 learners that uploaded 33 619 assignment solutions for 76 tasks divided into 7 modules available on the platform. The difficulty of tasks varied, with both very easy and very demanding tasks. The available modules with their respective number of tasks are presented in Table 1.

**Table 1. Modules with the respective numbers of tasks and task ratings**

Module	Tasks	Ratings
1. Types	11	657
2. Conditional statement	10	493
3. Recursion	10	425
4. Loops	11	356
5. Recursion on Arrays	8	160
6. Loops on Arrays of numbers	12	262
7. Loops on Arrays of characters	14	187
Sum	76	2540

Source: authors' own work.

At the beginning of the course the students were asked to self-evaluate their level of knowledge concerning programming fundamentals on a 5-point Likert scale in the range: 1 – lack of knowledge, 5 – very good knowledge. For the following comparison, those students declaring no or very little previous experience with programming (responses 1 or 2) were as-

signed to the group of beginners, A (n=152), while the remaining students declaring previous experience with programming were assigned to the experienced group, B (n=85). The number of users and task submissions (attempts), divided into modules for each group, is presented in Table 2. The initial number of students enrolled in the course was equal during both periods; however, more students decided to use the application in period P2. This may result from the very positive feedback the application received from students using it in the first period. The new students were encouraged to use the application by their older colleagues. Therefore, the students in period P2 started using the application earlier, on average, which may to some extent explain the differences described in the following sections.

Several aspects of the summary presented in Table 2 are important according to this study. There were more learners from the group of beginners using the application, which may be for the following reason. About the half of the students of the first semester at the faculty declared having very low or no previous experience with programming. These students were in general more eager to use the application as it allowed them to experience more uncertainty related to the course material than the students from the experienced group. The students from the experienced group might have felt more confident about their level of knowledge and therefore were less interested in using additional resources.

It may also be observed that the engagement of the students across all modules was stable. The number of attempts across all modules varied slightly; however, the average number of submissions was high for every module. This effect may result from the implementation of gamification elements, improving the engagement and motivation of the system users (Wang & Eccles, 2013; Pankiewicz, 2016).

**Programming task**

The aim of the programming task available on the platform was to create a small program, a function to return the correct value for any given input. In contrast to popular and simple question types available

**Table 2. Comparison of the number of users, total and average number of attempts (Att.) within modules (Mod.) in groups A and B across two analyzed periods: P1 and P2**

Mod.	P1-A			P1-B			P2-A			P2-B		
	Att.	Users	Avg									
1	903	53	17.0	383	25	15.3	2440	87	28.0	1014	43	23.6
2	1172	48	24.4	468	23	20.3	2455	79	31.1	904	39	23.2
3	1409	53	26.6	600	29	20.7	2596	82	31.7	1245	42	29.6
4	1527	52	29.4	554	24	23.1	2970	80	37.1	1073	37	29.0
5	891	45	19.8	443	22	20.1	1610	64	25.2	637	35	18.2
6	1116	48	23.3	389	23	16.9	2181	70	31.2	745	31	24.0
7	1021	48	21.3	476	25	19.0	1676	61	27.5	721	33	21.8

Source: authors' own work.

## Elo Rating Algorithm for the Purpose of Measuring Task...

on e-learning platforms, such as multiple-choice or open-ended questions, the probability of guessing the correct answer in a reasonable number of attempts was very low for the programming task.

The purpose of the programming task was to create a logical sequence of operations, an algorithm, that solves a certain problem of various levels of difficulty. Consider the simple problem of checking whether two numerical values passed to a function are not equal. The learner was instructed that the aim of the task was to “create the function *bool IsNotEqual (int x, int y)* to return *false* if the numbers *x* and *y* are equal, otherwise return *true*.”

In order to submit the solution and receive a *score* (0–100%) and *feedback* from the system, the learner created a code containing the required signature of the function (name, parameters and type of the returned value) and code that returned the logical (Boolean) value of *true* or *false*, depending on the numbers passed to the function. After submitting the code to the platform, the code was actually executed by the test runner in order to verify if the function returned the expected results.

The *score* was calculated as the proportion of tests that ended in success to the overall number of tests performed on the code. The tests were defined by a lecturer. The number of tests depended on the complexity of the assignment, but usually varied between 5 and 10, which was enough to test simple functions. The purpose of the multiple tests was to assure that an uploaded solution returned the correct result for every potential combination of parameters. There could be later tests defined for the *IsNotEqual* function, to validate the correctness of its implementation: checking if the function returned *true* when the parameters *x* and *y* were not equal, e.g.  $x = 2$  and  $y = -2$ , and if it returned *false* when the parameters *x* and *y* were equal, e.g.  $x = 2$  and  $y = 2$ . In order to strengthen the reliability of the evaluation, further tests with several different parameter values could be defined.

Multiple uploads of the solution were allowed. The system provided feedback after every submission, involving three elements: 1) formal errors (if the programming fundamental errors were mostly syntax mistakes) returned by the compiler, e.g. the line of the code did not end with a semicolon and therefore the code could not be compiled; 2) warnings returned by the compiler, e.g. defining a variable that was not used in the program; and 3) test results returned by the test runner containing information about the effects of executing the submitted code.

If the compiler detected formal errors in the uploaded code, e.g. a missing semicolon, execution of the submitted code was impossible and therefore the submission received 0 points. If there were no errors in the submission, unit tests were then executed on the function by the test runner in order to check that the function returns the expected value for each defined input parameter set.

If the information returned by the compiler contained only warnings, the code was still executed

by the test runner; however, the submission did not receive a 100% score. Each warning detected by the compiler lowered the grade by 1%.

The third component of the feedback information presented all information about the *parameters* used to execute the unit test, the *expected result* and *actual result* returned by the function submitted by the learner.

### Compared groups

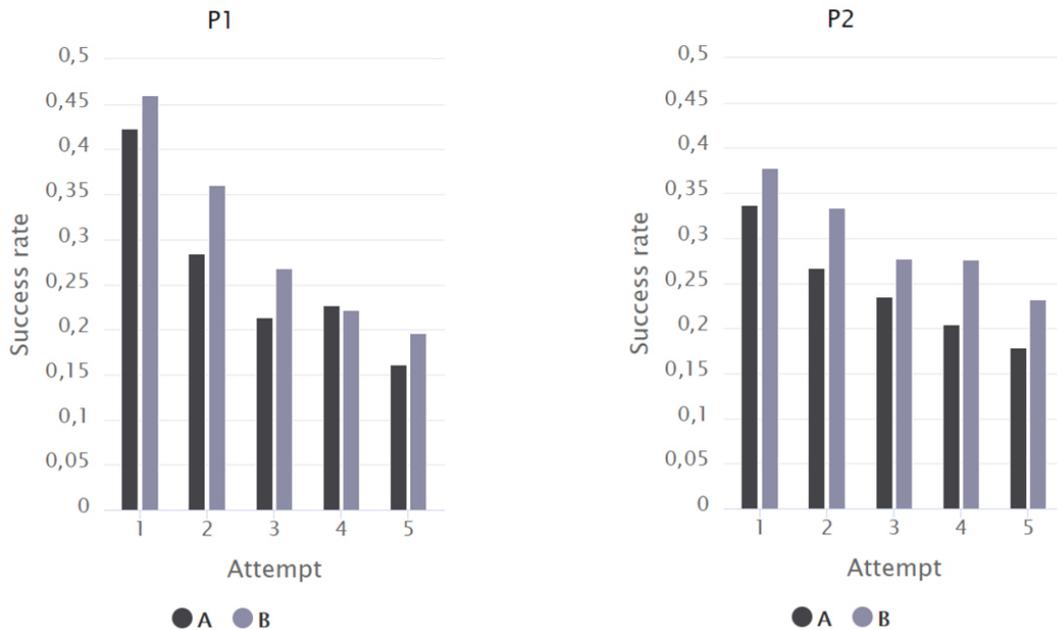
Each group, the beginners and experienced learners, had different initial levels of knowledge. This difference clearly led to other differences, such as in the average number of attempts needed to successfully solve each task. However, this study focuses on groups of learners of the same declared initial level of knowledge. The task difficulty estimations obtained from the group of beginners in period P1 was compared to the results obtained from the group of beginners in period P2. The same comparisons were performed on the groups of experienced learners. As a result, it can be shown that groups of the same declared initial level of knowledge presented significant differences in the number of attempts needed to completely solve the assignment across the analyzed periods. Secondly, it can be demonstrated how this difference impacted the quality of the difficulty estimations, as performed by the different methods of evaluating task difficulty.

Learners utilize the feedback information in order to upload a corrected version of the solution. The data shows that the tasks were on average very challenging, both for the beginners and the experienced learners. The success rate for all consecutive attempts decreased. Less than half of the first-attempt submissions received a maximum score (100%) for both groups. The success rate in consecutive attempts differed in both compared groups in each of the analyzed periods. In general, the more experienced learners succeeded more often than the beginners, which was as expected. However, the difference was expected to be higher. A moderate difference may occur if learners having previous experience with programming were optimistic in estimating their real level of knowledge. More reliable estimations of knowledge level was expected in the group of beginners. The overview of the success rate for the first five attempts for both groups across analyzed periods is presented in Figure 1.

Not all learners completely solved the tasks where they uploaded at least one solution. There may be different reasons for not attempting to solve a task completely, e.g. skipping to another task that seemed more interesting, lack of time, or decreasing level of motivation after several unsuccessful attempts. The comparison of the average number of attempts needed to completely solve the assignment for both groups in the two analyzed periods is presented in Figure 2.

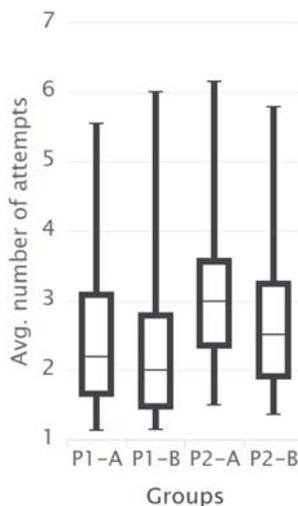
The results met the expectations, as it was observed that the experienced learners (B) needed less attempts to solve the assignments than the beginners (A) (Figure 2). This effect was observed in both compared periods: P1 and P2.

**Figure 1. Comparison of the success rate for the first five attempts across periods P1 and P2 for groups A (beginners) and B (experienced learners)**



Source: authors' own work.

**Figure 2. Comparison of the average number of attempts for the tasks solved correctly across periods P1 and P2 for groups A (beginners) and B (experienced learners)**



Source: authors' own work.

There were also statistically significant differences observed between the groups of beginners and experienced learners across both periods in terms of the number of attempts required to solve a task completely. The U Mann-Whitney indicated that the number of attempts in period P1 was significantly lower than in period P2 for both analyzed groups: A and B (p-value < 0.001) (Table 3).

This test is used when the assumptions of the t-test cannot be met – which was the case in this analysis (assumption of normal distribution).

There were significant differences observed between the groups of learners declaring the same level of knowledge for each period. Potential reasons for these differences were explored in the previous sections. The primary difference between the groups is that users in period P2 began to use the application earlier. The tasks available on the platform did not change; however, significant differences explored between analyzed groups suggested that the estimations of task difficulty may also differ significantly. The purpose of the following analysis

**Table 3. Comparison of the average number of attempts for tasks solved correctly across periods P1 and P2 for groups A and B with results of the U Mann-Whitney test**

	P1	P2	U Mann-Whitney test
Avg. no. of attempts – Group A	n = 2389	n = 3665	
	2.4914	3.1945	p < 0.001
Avg. no. of attempts – Group B	n = 1151	n = 1836	
	2.2684	2.774	p < 0.001

Source: authors' own work.

## Elo Rating Algorithm for the Purpose of Measuring Task...

is to explore the relationships between differences in the difficulty estimations that result from the fact that the tasks were solved by different learner groups – even if the initial level of knowledge was held constant.

The following chapter compares three methods of difficulty estimation: Elo rating algorithm, proportion correct and learner feedback, in terms of stability of the delivered difficulty estimations.

### Results

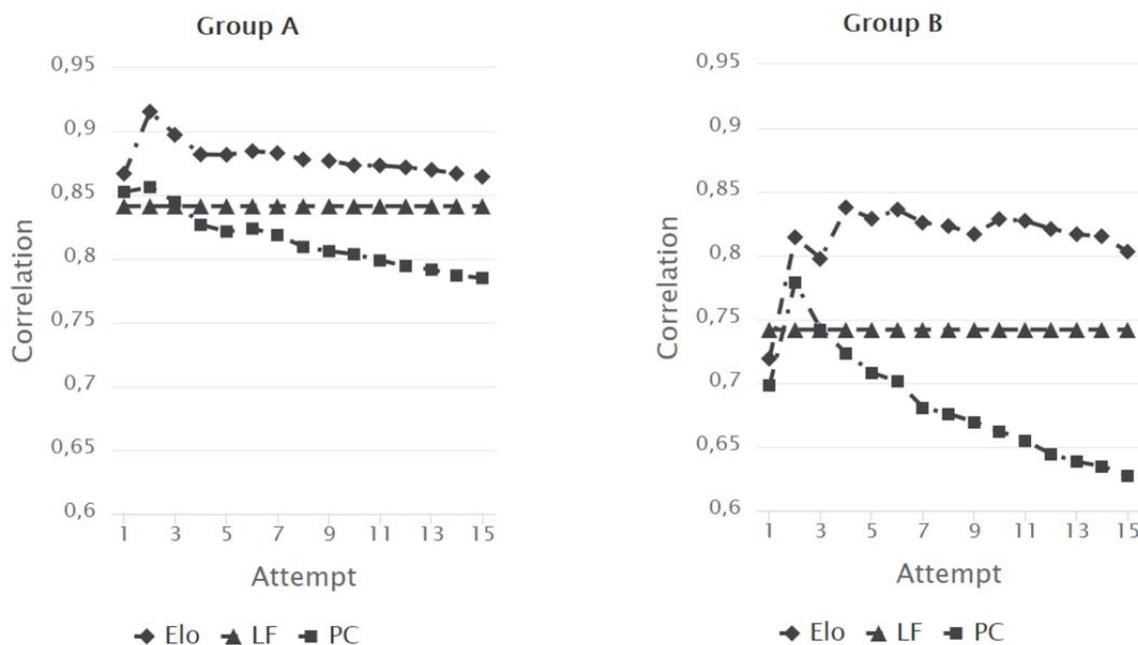
For the purpose of this study, the optimal value of the Elo parameter  $K$  was evaluated by experiment. The range used for the search was between 1 and 50. The highest correlation between estimations of difficulty in both the analyzed periods for the group of beginners (A) is observed for a  $K$  value of 11. For the group of experienced learners (Group B), the highest correlation is observed for a  $K$  value of 30. The Elo rating algorithm calculations were applied with the PlayerRatings R package (Stephenson & Sonas, 2019) with the default value for the initial rating for both learners and tasks.

The results of the analysis (Figure 3) show that group of beginners (Group A) achieved more stable estimations of task difficulty. The difficulty estimations were less stable for the group of experienced learners (Group B). In both groups, the Elo rating algorithm outperformed the other methods, and was the least sensitive to differences between both analyzed groups across the compared periods.

The Pearson's correlation coefficient was calculated for the estimations of task difficulty in the two learning periods (P1 and P2). The analysis was performed for two groups of learners: beginners (Group A) and experienced learners (Group B). Three methods were compared: Elo rating algorithm, learner feedback (LF) and proportion correct (PC) for a number of attempts ranging from 1 to 15 (Figure 3).

It can be observed that the difficulty estimations from the Elo rating algorithm were more consistent across the analyzed periods (correlation in the range 0.87–0.92 for Group A and 0.72–0.84 for Group B) than LF (0.84 for Group A and 0.74 for Group B) and PC (0.78–0.85 for Group A and 0.63–0.78 for Group B) for both analyzed groups. Elo was less malleable than PC, and this effect has been observed as stable with growing numbers of analyzed attempts. This may result from the main assumption of the rating algorithm and the involvement of the probability estimations in the rating change. While every attempt influenced the PC estimations with the same ratio, its impact on Elo depended on the probability of winning (or losing) the game. Therefore, the rating change was less dynamic for attempts where the rating of the learner and task was similar and increased with greater distance between learner and task ratings. In terms of this analysis, the increasing number of user's unsuccessful attempts dynamically increased the difference in the PC estimations. For Elo, each additional unsuccessful attempt had less impact on the task rating, as it became less probable that the learner would solve the assignment and the dynamic of the task rating change decreased.

**Figure 3. Correlation between task difficulty estimations in periods P1 and P2 for the groups of beginners (Group A) and experienced learners (Group B). Comparison of three methods: Elo rating algorithm (Elo), learner feedback (LF) and proportion correct (PC) for the number of attempts between 1 and 15**



Source: authors' own work.

## Conclusions

The aim of this research was to compare methods of task difficulty estimations suitable for use within online learning environments for the purpose of adaptive item sequencing. Three methods were compared in terms of stability of the delivered results: Elo rating algorithm (Elo), proportion correct (PC) and learner feedback (LF). The comparison was performed on data from two periods, P1 and P2. Two groups of learners were compared: beginners (A) and experienced learners (B). Assignment to the appropriate group was based on the learner self-assessment.

It has been shown that Elo outperforms the PC and LF methods and delivers the most stable estimations for both compared groups of learners. The task difficulty estimations performed on the group of beginners (Group A) are overall more stable than for the group of experienced learners (Group B). The reasons of this discrepancy may be two-fold: it may be assumed that the self-assessment of the current level of knowledge for students with no or little previous experience is more reliable than for the students declaring more previous experience. Students who already had previous experience with programming may tend to overrate their knowledge level in a self-assessment. The second aspect is related to the difference in the number of students and recorded attempts across both groups. The number of collected attempts for Group B may be too low to deliver stable results.

Although the self-assessment method is a simple and quick method of estimating initial knowledge level, it seems to be more reliable if the declared knowledge level is low or very low, at least in terms of the analyzed course subject with a task that is demanding: a programming assignment. In order to avoid problems with estimating the initial level of learner knowledge, a pre-test could be used to verify the self-assessment ratings.

Several of the study assumptions need to be taken into consideration in implementing Elo in other areas of education. Firstly, the compared groups share similarities in terms of previous educational experience. Secondly, the amount of gathered data is sufficient to draw conclusions: although the activity was not mandatory, the level of student engagement was very high. Thirdly, the programming task utilized in the study is demanding. The use of a multiple attempt approach for multiple choice or even mathematical open-ended questions could lead to different outcomes.

Online learning environments may benefit from the implementation of fast methods for estimating task difficulty and learner ability. This study has shown that the implementation of the Elo rating algorithm in the context of a learning platform where the task is demanding, with multiple attempts being allowed and feedback provided, may be a reasonable choice.

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## WE RECOMMEND

**Olga Robinson, Alistair Coleman, Shayan Sardarizadeh,**  
*A report of anti-disinformation initiatives*

Fake news is a global problem that challenges how we share information and perceive the world around us. Evidence of home-grown and foreign online influence operations has caused alarm and concern among politicians and voters. There are fears that democratic institutions and national elections are under threat from mis-, dis-, and mal- information shared on a huge scale online and on social media platforms. Mob lynchings and other violence based on false rumors have turned fake news into an emergency in some parts of the world, costing lives and causing significant problems for societies. This has prompted a number of governments to adopt measures ranging from legislative and legal action to media literacy and public awareness campaigns to fight the spread of disinformation.

In this report, BBC Monitoring's specialist Disinformation Team investigates fake news landscapes around the world and analyses a range of measures adopted by governments to combat disinformation. The study provides a geopolitical context with timely, relevant examples from 19 countries in four continents (with a particular focus on European nations). The team also reports on the European Union because of its size, power, and influence.

Concerns about making just, effective laws to counter fake news are amplified by some countries' creation of legislation which purports to fight disinformation but appears instead to be used to attempt to gain greater control over their media environment and to suppress debate on social media. Our report indicates that there does not currently seem to be any quick fix that would allow governments to curb the spread of disinformation effectively through legislation without prompting criticism.

*Excerpts from the report published by the University of Oxford, August 2019.*

More information at <https://oxtec.oii.ox.ac.uk/wp-content/uploads/sites/115/2019/08/OxTEC-Anti-Disinformation-Initiatives-1.pdf>



# Transforming 21st-century Leader Competencies by Developing Mindfulness



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## Abstract

Mindful leadership is a competency of the future which enables leaders to effectively function in a challenging and changing VUCA world by being able to focus their attention in three directions: at themselves, at others and at what is happening around them.

Mindfulness facilitates intra and interpersonal skills, increases mental fortitude and resistance to time and performance pressure, as well as the ability to think rationally and creatively, which helps us make faster, more rational and innovative decisions to achieve a competitive advantage. Mindfulness also helps us look after co-workers and our own welfare, making it an important factor in preventing occupational burnout. The article assumes an evidence-based approach which, based on the state of the research, indicates that it is viable to conduct positive interventions using a robust theoretical framework and documented empirical research results.

**Keywords:** competencies of the future, attention management, mindfulness, MBSR, self-regulation, mental fortitude, mental training, effectiveness

*This article provides a review of the relevant literature and research results related to developing the psychosocial skills of leaders to facilitate adaptation to the requirements of the modern economy. It is important to specify the broad spectrum of the direct and indirect positive effects of developing mindfulness, which results from performing psychoeducational activities in the form of mental training. These benefits can be analyzed from an individual perspective (improved mental fortitude, concentration, productivity) and from the perspective of entire organizations (competitive advantage). It is also worth noting that these training methods have been successfully utilized for many years in sports for the purpose of achieving optimal performance, while their presence in business is best described as marginal.*

*It is also important to take into account new trends in management and actively incorporate innovative methods into HR policies and strategies as part of positive MBIs (mindfulness-based interventions), which have been utilized by some international corporations for several years.*

The article is based on a review of the latest articles and research related to mindfulness, as well as the authors' own experiences and reflections as

a practitioner of mindfulness and management. The main criterion was an approach based on evidence and implementation examples which indicate that it is possible to conduct positive mindfulness-based interventions in organizations.

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## Attention in a VUCA<sup>1</sup> world and the importance of mindfulness

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The modern business environment is referred to as a VUCA world, filled with new global challenges which become increasingly unpredictable as the digital revolution progresses. Due to its universal nature, the term can be applied to any time period, though it is of particular relevance to the modern world, which is filled with unprecedented, dynamic and large-scale socioeconomic changes that have a global effect. The acronym VUCA was first used in 1987 in relation to the theory of leadership by Warren Bennis and Burt Nanus (1985), used to describe and analyze the volatility, uncertainty, complexity and ambiguity of the general state of the world and the situation which arose after the end of the Cold War (U.S. Army Heritage, 2019).

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<sup>1</sup> <https://pl.wikipedia.org/wiki/VUCA>

A VUCA world features challenges and opportunities in business and necessitates companies to take innovative, unorthodox HR policy and strategic actions. The authors of such projects aim to develop the competencies of the future, while utilizing the MBI model enables leaders to develop their internal resources and at the same time facilitate agility and flexibility in adapting to the rapidly-changing environment. This gives rise to a new, previously unknown method of team-leading, and enables the building of mindful leadership by managing one's own attention and by mental and emotional self-regulation.

However, the human mind has a limited information processing capacity. In order to avoid overloading, the human cognitive system uses attention, a mechanism which filters incoming stimuli. This means that only information which is relevant at a given time is processed, and excessive or disruptive signals are discarded.

Attention is thus a mechanism which alleviates information overload (Necka, Orzechowski, & Szymura, 2019, p. 187). This complex functionality of the human mind renders it possible to effectively navigate and act in an environment filled with millions of stimuli (both external and internal). Multiple other processes also take place at the same time in the cognitive system, such as memorization, thinking, perceiving, interpersonal perception and speech. Even though all of those cognitive processes are closely interrelated, attention stands above them all, and their proper functioning is dependent on whether attention is functioning properly.

However, research has indicated that various internal and external factors may disrupt attention. Mind wandering is a natural state of mind which occurs 46.9% of the time on average and negatively correlates with the feeling of happiness, as well as concentration and effectiveness at work (Killingsworth & Gilbert, 2010). It involves being physically present during an activity while being absent mentally and emotionally. Multiple studies have demonstrated a relationship between mind wandering tendencies and shorter attention spans. Questionnaire studies measuring mind wandering tendencies demonstrate a link between increased vulnerability and irrelevant stimuli (Forster & Lavie, 2014). Based on diary studies (Unsworth, McMillan, Brewer, & Spillers, 2012), those whose minds tend to wander are also inclined to experience cognitive failures, i.e. everyday mistakes resulting from being inattentive or forgetful. Mindfulness involves directing attention where we need it and focusing on one thing at a time, which facilitates concentration, helps reduce stress quicker and improves short-term memory (Goleman & Davidson, 2018, pp. 146–148).

How we perceive time, including being relatively focused on the time frames of the past, present and future and our subjective assessment of these time frames, is referred to as our temporal perspective (Zimbardo & Boyd, 1999). It can also contribute to disrupting the attention process and concentrating

on the here and now. Higher levels of mindfulness facilitate a more balanced temporal perspective, rendering it possible to flexibly switch between time frames while being less focused on the negative aspects of the past and negative future prospects, which has a positive influence on creating well-being (Stolarski, Vowinckel, Jankowski, & Zajenkowski, 2016; Rönnlund et al., 2019).

A frequent external distractor resulting from technological progress is “informational noise” (Babik, 2012), whose symptoms include: rapid increase in the amount of information produced, contradictory nature and inaccuracy of available information and its fragmentation. In addition, research shows that the myth of multitasking can have a negative impact on cognitive processes and may reduce effectiveness by up to approx. 40% (Rogers & Monsell, 1995; Rubinstein, Meyer, & Evans, 2001). While multitasking renders it easier for the brain to scatter attention, mindfulness enables us to realize that our attention is scattered, helping us return to the task at hand.

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## Attention as a limited resource

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As stated by Peter Drucker (2009, p. 143), “if there is any one ‘secret’ to effectiveness, it is concentration. Effective executives do first things first and they do one thing at a time.” Leaders involved in projects which require in-depth analysis and complex, quick decision-making experience the natural limitations of the human mind and how attention works. According to the attentional resources theory, every mental phenomenon requires a certain amount of cognitive resources, of which the cognitive system possesses a limited amount (Kahneman & Tversky, 1973). Also, the dual process theory indicates that two extremely different strategies are used by the human mind to make decisions (Table 1). Faced with several matters at once, the mind uses a single, limited pool of resources to power two thinking systems: S1 and S2 (Kahneman & Tversky, 1979).

The majority of cognitive errors relate to the activity of the subconscious, System 1, which frequently makes important decisions based on a minimal amount of information, and takes into account the experiences gained from previous activities to save resources (energy, attention and time). System 2 requires a great deal more mental effort than System 1. System 2 most frequently works slowly, and focusing on a taxing task eliminates other stimuli in order to reduce energy expenditure. During a “mental sprint”, people tend to be virtually blind, and leaders acting in a changing environment and under the pressure of time can make mistakes, overlook important information, experience heightened levels of stress and make ineffective business decisions. This phenomenon is illustrated by the experiment in which we fail to notice a gorilla which appears between players while counting the number of times the ball has been passed between them (Chabris & Simons, 2011).

**Table 1. Kahneman’s two systems of thinking**

<b>System 1</b>	<p>Is automated and fast, reacts effortlessly or with little effort, operates outside of conscious control.</p> <p>Most frequently we have no sense of conscious control over it. It is connected to the inherent abilities also present in animals, related to cognition from birth and emerging after long training, both as that which is simple, learned (e.g. multiplication, reading) and that which is more advanced (e.g. chess patterns).</p>
<b>System 2</b>	<p>Acts carefully and precisely. Focuses attention on actions which require mental effort.</p> <p>Used for complex calculations, perceived as a sense of subjective focus and deliberate concentration on the task. It is related to actions that require concentration. It is possible to pause work by redirecting attention to a different object and focusing on it (e.g. focusing on the words of a particular person in a loud crowd, looking for a woman with gray hair).</p>

Source: authors’ own work based on Kahneman (2012).

If there is a high number of impulses and variables which are characteristic of VUCA, S1 and S2 work together, whereby S1 creates experiences and emotions which later become the basis for conscious beliefs and deliberate choices by S2. Leaders of the future must be flexible enough to manage increasing uncertainty, complexity, volatility and uncertainty (VUCA) in their work environment, and also be able to meet growing expectations regarding hard and measurable business performance.

The cult of effectiveness and the expectation of quick solutions forces executives to take shortcuts, both in thinking and acting, which is characteristic of System 1 and ultimately yields results which are completely different from that intended. The context within which a leader is operating increasingly necessitates intentional actions aimed at developing System 2. Mindfulness-based interventions (MBIs) support System 2 and the adaptive potential of leaders, facilitating creativity, constructive thinking, concentration, taking into account key information in rational decision-making and solving complex problems.

Haste and an excess of matters to resolve generate additional tension, psychosomatic disorders and the related emotional states affecting the human psychophysiology (e.g. anxiety, depression, fatigue and stress) and manifesting as behavioral symptoms (e.g. irritability and anger) (Dohrenwend, Shrout, Egri, & Mendelsohn, 1980), which sometimes may lead to occupational burnout. Staying up-to-date with the current job market requires high levels of mental fortitude and self-regulation. The scale of the problem is best illustrated by a study conducted in France (Charbotel et al., 2009) among 2000 call center employees. The study demonstrated that, over a period of 12 months, 24% of the employees used psychoactive medication to alleviate the stress resulting from their work. In a study conducted on a group of 49 people in Canada, a positive MBI resulted in 43 participants experiencing reduced stress, anxiety and fatigue levels, an elevated mood and improved relations with co-workers (Walach et al., 2007).

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### Competencies of the future

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The definition of competencies and skills is used in psychological and management literature in a wide variety of contexts. In this article, the authors use the two terms interchangeably, assuming “competency” to refer to the belief in one’s effectiveness, a certain attitude towards oneself which is based on the belief that one is able to properly adapt and influence the environment. Researchers also use the term “sense of efficacy” (White, 1971) in this context, as well as “self-efficacy” (Bandura, 1989), “self-respect” and “self-esteem” (Smith, 1974). In their opinion, thus defined, competencies are necessary to make an effort to resolve problematic situations. If successful, the result is further reinforcement of one’s self-esteem and sense of agency. The term “skill” is used to refer to the adaptive ability of managing one’s environment (Moore & Fine, 1996). It involves not only being adapted but also deliberately adapting to our environment. It thus refers to the process of changes which individuals can effect on themselves, as well as those implemented in their surroundings. In this context, it is directly related to the intentional and conscious development of the competencies characteristic of a leader of the future via mindfulness training.

*The Future of skills. Employment in 2030* report (Bakhshi, Downing, Osborne, & Schneider, 2017), indicates that, by 2030, interpersonal (psychosocial) systemic, social and cognitive (originality, creativity, active learning) skills will be in high demand on the job market. In addition, *The Future of Jobs Report 2018*, published by the World Economic Forum (WEF, 2018) has for several years included a set of 10 most important competencies necessary to achieve success on the job market after 2020 (Table 2). The subsequent editions of the report contain a majorly similar set of competencies, with only some being replaced.

According to the report, instead of focusing on automation and reducing labor costs, the strategy of expanding roles and retraining employees offers a broader range of value-generating actions which

# Transforming 21st-century Leader Competencies...

**Table 2. Comparison of the demand for particular skills in 2022**

Trending	Declining
<ul style="list-style-type: none"> <li>• analytical thinking and innovation</li> <li>• active learning and learning strategies</li> <li>• creativity, originality and initiative</li> <li>• technology design and programming</li> <li>• critical thinking and analysis</li> <li>• complex problem-solving</li> <li>• leadership and social influence</li> <li>• emotional intelligence</li> <li>• reasoning, problem-solving and ideation</li> <li>• systems analysis and evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• manual dexterity, endurance and precision</li> <li>• memory, verbal, auditory and spatial abilities</li> <li>• management of financial, material resources</li> <li>• technology installation and maintenance</li> <li>• reading, writing, math and active listening</li> <li>• management of personnel</li> <li>• quality control and safety awareness</li> <li>• coordination and time management</li> <li>• visual, auditory and speech abilities</li> <li>• technology use, monitoring and control</li> </ul>

Source: authors' own work based on WEF report (WEF, 2018).

make use of people's talents, those which can be performed by employees who no longer have to spend time on routine, repetitive tasks. The most popular mode of thinking is "man plus machine", not "man versus machine", i.e. expanding human capabilities instead of replacing them.

## Mental training in developing the competencies of the future

According to the 9MMSA (Nine Mental Skills of Successful Athletes) model, all great athletes have nine mental skills (Lesyk, 1998a) which form the basis of their achievements, both in sports and other areas of life. Moreover, these skills can be acquired and improved via training and practice (Table 3). The model is used in sports training by institutions such as the Ohio Center for Sport Psychology and portrays the relationship between key mental skills divided into three levels: performance, preparatory and basic. Each level also comprises the skills from the levels below it and also determines the development of those above it.

The strategic role of mental skills in the high-level performance of successful athletes was demonstrated by Jean M. Williams and Vikki Krane (1998), who discovered that certain mental skills (e.g. goal-setting, self-regulation of arousal, heightened concentration, high levels of self-confidence, motivation and commitment) usually correlate with success.

Within the context of the effectiveness of modern leaders, the intentional development of those skills with the use of psychoeducation appears equally valid (Table 3).

## Mindfulness-Based Interventions (MBIs)

The mindfulness-based approach is becoming increasingly popular, year by year, as indicated by the growing number of articles on the topic published in scientific journals. According to the American Mindfulness Research Association (AMRA, 2019), the number of papers published between 1980 and 2009 was 481, and then between 2010 and 2018 this rose to 4441 – which constitutes an almost tenfold increase for an 8-year period compared to the total number of articles published in the previous 30 years.

In common parlance, mindfulness is frequently conflated with the concept of meditation, and is often associated with the religious practices of the Far East. The term "meditation" encompasses a variety of practices which, analogously to various sports disciplines, focus on developing various types of activity. Mindfulness is a secular meditative practice which facilitates mental activities involving the intentional and conscious management of attention. The general lack of knowledge of the nature of the contemplative techniques on which mindfulness is based, and their possible business applications, necessitates educating organizations in this subject.

**Table 3. Key mental skills necessary to achieve success (9MMSA)**

	Level	Mental skills
Level 3	Performance (performance skills)	(9) concentration (8) managing emotions (7) managing anxiety
Level 2	Preparatory (preparatory skills)	(6) mental imagery (5) self-talk
Level 1	Basic (basic skills)	(4) people skills (3) goals and commitment (2) motivation (1) attitude

Source: authors' own work based on Lesyk (1998a, 1998b).

From the neurobiological perspective, based on how attention processes are managed, two complementary types of meditation exist (Travis & Shear, 2010). These are focused attention (concentration and attention in a state of open perception) and open monitoring (mindfulness – sharpening of attention processes). Mindfulness involves a process of flexible transitioning between one mechanism: focused attention meditation (FAM) and: open monitoring meditation (OMM), where the latter is more dominant than the former. Mindfulness practice reduces the activity of the *default mode network* (DMN) and mind wandering. Meditation affects the various areas of the brain primarily responsible for attention processes, concentration, emotional regulation, increased awareness of external and internal stimuli and feelings (Treadway & Lazar, 2009). OMM involves many attention processes, increasing the ability to concentrate and utilize attention resources, offering better control over automatic processes (Moore, Gruber, Derose, & Ma-

linowski, 2012). Also observed was more in-depth information processing and a positive impact of OMM on attention allocation control (Van Leeuwen, Singer, & Melloni, 2012), as well as physical pain management (Kabat-Zinn, 1982; Zeidan et al., 2010).

Mindfulness meditation is a form of mental training which enables individuals to develop their ability to direct and maintain kind and non-judgmental attention at the present moment (Kabat-Zinn, 2012). This may not only reduce mind wandering during training, but also influence the level of cognitive abilities after training, improve one’s mood and increase one’s sense of happiness in everyday life (Brewer et al., 2011). Numerous types of mindfulness-based interventions have been developed, which may be clinical in nature or assume the form of training programs. Research conducted over many years proves that mindfulness has a wide range of positive effects on the human psyche and physiology, which is beneficial to both employees and entire organizations in the business environment (Table 4).

**Table 4. Benefits of practicing mindfulness (potential areas of influence)**

	Impact of mindfulness	Benefits for the employee	Benefits for the organization
Physical	↑ immune system ↓ recovery time	↑ disease resistance	↓ absence costs ↓ recruitment costs ↓ overloading healthy employees ↑ pro-health behaviors
	↔ heart and circulatory system ↓ risk of hypertension ↓ circulatory system disorders	↔ blood pressure regulation ↓ heart disease risk	
	↑ control over thoughts ↓ stress level ↑ falling asleep ↓ insomnia	↑ sleep	
	↓ stress-related psychosomatic disorders ↓ chronic pain level	↓ pain	
	↑ self-awareness of one’s body and its needs ↓ risk of obesity ↓ risk of psychosomatic and mental disorders	↑ awareness of the needs of the body ↑ sensitivity to physiological needs	
Mental	↑ awareness of stress-inducing factors ↑ change of habitual reactions ↑ self-awareness in stressful situations ↑ reducing tensions makes it possible to restore ↑ balance and relaxation ↓ cortisol levels – stress hormone	↓ stress ↑ vitality and energy management	↑ productivity ↑ correct decisions ↑ timely task completion ↑ work quality ↑ flow at work ↑ job satisfaction ↑ involvement
	↑ correct and more rational decision-making ↑ memory and attention span ↑ ability to filter and select information ↑ conscious filtering out of excessive external stimuli ↑ effectiveness	↑ concentration ↑ memory ↑ personal effectiveness ↑ task prioritization ↑ managing oneself in time	

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	Impact of mindfulness	Benefits for the employee	Benefits for the organization
Mental	<ul style="list-style-type: none"> <li>↑ brain plasticity</li> <li>↑ learning and memorizing processes</li> <li>↑ emotion regulation and empathy</li> </ul>	<ul style="list-style-type: none"> <li>↑ emotional intelligence</li> <li>↑ empathy and compassion</li> </ul>	<ul style="list-style-type: none"> <li>↑ timely task completion</li> <li>↓ conflicts</li> <li>↑ positive atmosphere at work</li> </ul>
	<ul style="list-style-type: none"> <li>↑ proactivity</li> <li>↑ responsible for one's own reactions</li> <li>↑ self-awareness of one's emotions and ability to self-regulate</li> <li>↑ ability to listen and speak attentively</li> </ul>	<ul style="list-style-type: none"> <li>↑ effective communication</li> </ul>	<ul style="list-style-type: none"> <li>↑ quality of relationships and teamwork</li> <li>↑ customer service quality</li> <li>↑ effectiveness of meetings</li> <li>↑ time savings</li> <li>↑ involvement</li> </ul>
	<ul style="list-style-type: none"> <li>↑ ability to think outside the box</li> <li>↑ ability to solve problems creatively</li> </ul>	<ul style="list-style-type: none"> <li>↑ creativity</li> </ul>	<ul style="list-style-type: none"> <li>↑ innovation</li> <li>↑ agile teamwork</li> <li>↑ flexibility and openness</li> <li>↑ flow at work</li> </ul>
	<ul style="list-style-type: none"> <li>↑ self-awareness of thoughts and feelings</li> <li>↓ risk of depression</li> <li>↓ risk of occupational burnout</li> </ul>	<ul style="list-style-type: none"> <li>↓ risk of occupational burnout</li> <li>↑ mental and emotional stability</li> </ul>	<ul style="list-style-type: none"> <li>↑ organizational culture transparency with people at the center</li> <li>↑ identification with the company</li> <li>↑ employee loyalty</li> <li>↑ CSR actions</li> <li>↑ employer branding</li> </ul>

Source: authors' own work based on research published by AMRA.

In the workplace, mindfulness translates to developing intra and interpersonal skills and is directly related to developing emotional intelligence (Goleman, 1999). It facilitates the decision-making process, increases the efficiency and mental fortitude of employees and improves communication (Shapiro, Wang, & Peltason, 2015).

Mindfulness is a special type of attention: conscious, non-judgmental and directed at the present moment (Kabat-Zinn, 2012). It is also defined as the self-regulation of attention focused on a direct experience, enabling better identification of mental events in the present (Bishop et al., 2004).

Mindfulness is a competency which can be developed and fits the three-stage process characteristic of behavioral changes: a) knowledge of a given subject (I know what), b) skills (procedural knowledge – I know how and I can do it), and c) stance (I want to and I am ready to put my knowledge to use). The process of learning mindfulness also matches Noel Burch's 1970s model of "4 stages of competence", but only incorporates its first three stages (Jakubczak, 2010): unconscious incompetence (automatic, habitual decisions and actions), conscious incompetence (stopping, noticing and realizing something) and conscious competence (deliberate choice of behaviors, actions or lack of actions). Stage four, unconscious competence (automatic and effortless use of a new skill), directly contradicts the definition of mindfulness, i.e. attention

which is conscious, non-judgmental and directed at the present moment (Kabat-Zinn, 2012).

## Example actions facilitating the development of mindfulness

Currently one of the most increasingly popular psychoeducational techniques in business, as well as a secular form of promoting mindfulness, is the MBSR<sup>2</sup> (Mindfulness-Based Stress Reduction) course developed in 1979 by Professor Jon Kabat-Zinn. It is worth noting that this course is still being used in its original form today. The Institute for Mindfulness Based Approaches (IMA<sup>3</sup>) was able to train an international body of teachers, which enabled the program to become one of the most popular stress-reduction courses in the world. This basic training program consists of 8 weekly sessions lasting 2.5 hours and one Mindfulness Day. The practice part involves exercises, both formal and informal, otherwise known as "meditation" and which entail the mindful performance of everyday tasks (Table 5).

Studies conducted on the MBSR program (Grossman, Niemann, Schmidt, & Walach, 2004) indicate that course participants experience a noticeable increase in their quality of life, changes in habitual behaviors, improved concentration and self-esteem, higher understanding of themselves and an elevated sense of responsibility for their own life. It is worth noting that

<sup>2</sup> <https://mbsrtraining.com/about-jon-kabat-zinn/>

<sup>3</sup> <https://www.institute-for-mindfulness.org/offer/mbsr/MBSR-Teacher-Training>

**Table 5. MBSR – types of practices**

Formal practice – concrete exercises	Informal practice – mindful performance of everyday tasks
(1) body scan (2) sitting meditation (awareness of breathing, thoughts, emotions, choiceless awareness) (3) mindful movement inspired by joga	(1) waking up (2) brushing teeth (3) showering and bathing (4) eating and drinking (5) walking and walking meditation (6) doing the dishes (7) reading and writing mails (8) conversation (9) all other everyday tasks (10) self-observation in written form (diary of mindfulness)

Source: authors' own work based on the materials of the MBSR Teaching College.

achieving such results is only possible by being fully committed and via regular individual practice.

Other forms of positive MBIs based on the MBSR program and featuring a concrete structure include Mindfulness-Based Cognitive Therapy (MBCT<sup>4</sup>), developed by behavioral therapists Zindel Segal, Mark Williams and John Teasdale (2002), as well as Mindfulness-Based Compassionate Living (MBCL<sup>5</sup>), developed by Erik Van den Brink, Frits Koster and Victoria Norton (2018).

Since the ground-breaking article by Segal et al. (2002) on the applications of MBCT in treating depression, both clinicians and researchers have begun to realize the therapeutic potential of combining mindfulness and traditional approaches in cognitive-behavioral therapy, which enables patients to gain a different perspective on the pain and suffering caused by depression and other emotional issues, and also to achieve well-being and to function better. Randomized clinical trials have proven the effectiveness of this program in preventing recurrent depressive episodes, and MBCT is recommended by the National Institute of Clinical Excellence (NICE) as an effective MBI. The MBCT course structure mirrors the basic MBSR course, and the exercises have been adapted for therapeutic purposes.

The MBCL course is considered to expand mindfulness practice and serves as a complementary program for those who have completed MBSR/MBCT. It includes exercises which help cultivate compassion towards oneself and others. Compassion practice, which is a default part of the basic MBSR course, is emphasized in this program, in addition to more

in-depth mindfulness training. The advanced MBCL course is based on the scientifically proven application of compassion described by Paul Gilbert (2009), Christopher Germer (2009), Kristin Neff (2011), Tara Brach (2003) and Rick Hanson and Richard Mendius (2009). Neff (2003a, 2003b) lists three components of self-compassion. The first component is kindness and understanding towards one's own weaknesses and errors ("self-kindness"), which is used to avoid frustration, stress and self-criticism. The second component is interpreting one's own experience as part of the general experience of all humans ("common humanity"), which helps prevent frustration and irritation in the face of failure and counteracts the sense of global isolation and loneliness stemming from the belief that you are the only person who makes mistakes and is suffering. The third component is mindfulness, which manifests in self-reflection and the self-awareness of feelings and experiences without judging, controlling or suppressing, which helps achieve greater control over one's own feelings. Research conducted so far has confirmed the theoretical predictions regarding better mental health and emotional functioning of those with higher levels of compassion towards oneself and their generally higher self-regulation potential. The MBCL course structure (Van den Brink et al., 2018) mirrors that of the basic MBSR course, and the difference between the two being the former offers more exercises for participants to select.

Companies which implement mindfulness practices in their businesses include such international organizations as Salesforce<sup>6</sup>, IKEA<sup>7</sup>, Ford<sup>8</sup>, Accenture<sup>9</sup>, Dentons<sup>10</sup> and Starbucks<sup>11</sup>. Moreover, Google<sup>12</sup>

<sup>4</sup> <http://www.mbct.com/>

<sup>5</sup> <https://www.compassionateliving.info/mindfulness-based-compassionate-living-mbcl/>

<sup>6</sup> <https://www.salesforce.com/ca/blog/2019/03/salesperso-practices-mindfulness.html>

<sup>7</sup> <http://mindfulnessinside.pl/mindfulness-case-study-ikea-w-pracy>

<sup>8</sup> <https://www.ford.com.au/about-ford/newsroom/2016/as-australians-look-to-mindfulness-ford-offers-company-first-em/>

<sup>9</sup> <https://www.accenture.com/us-en/blogs/blogs-changing-mental-health-conversation>

<sup>10</sup> <https://www.dentons.com/pl/whats-different-about-dentons/connecting-you-to-talented-lawyers-around-the-globe/news/2018/december/dentons-launches-an-innovative-mindfulness-program-as-the-first-european-law-firm>

<sup>11</sup> <https://www.linkedin.com/pulse/starbucks-engages-mindfulness-keith-fiveson>

<sup>12</sup> <https://siyli.org/>

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and SAP<sup>13</sup>, in an effort to increase the emotional intelligence of their employees, have implemented a program developed by Google manager, Chade-Meng Tan, "Search Inside Yourself" (2017), which involves developing attention management skills that determine success and a personal transformation of both leaders and entire organizations.

The main research institution studying mindfulness, the Greater Good Science Center (GGSC<sup>14</sup>), is part of the University of California, Berkeley and works together with the Center for Compassion and Altruism Research and Education (CCARE) of Stanford University and the Center for Healthy Minds of the University of Wisconsin-Madison, as well as a number of non-academic institutions. It is known for its research and numerous publications on mindfulness, self-compassion and positive psychology, and its achievements can serve as a valuable source of information and inspiration for developing the organizational competencies of the future in leaders and mindful leadership.

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## Summary

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Positive mindfulness-based interventions are an example of the effective development-oriented actions already used in Olympic sports and, slowly, also in business.

They can be an answer to challenges faced by organizations in the modern VUCA world and prove to be an attractive management tool, particularly in the case of medium and long-term development activities. Currently, such interventions most frequently assume the form of individual, custom programs inspired by the 8-week MBSR courses rather than that originally proposed by Jon Kabat-Zinn, whose methods are supported by research and evidence.

Thus, the authors note that it is necessary for HR departments to select the correct types of psychological mindfulness-based interventions. In the case of custom training programs based on MBSR and certified MBSR courses, it is recommended to work together with qualified and certified teachers, whose international qualifications are published by the Institute for Mindfulness-Based Approaches (IMA<sup>15</sup>).

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<sup>13</sup> <https://www.sap.com/about/customer-involvement/global-mindfulness-practice.html>

<sup>14</sup> [https://ggsc.berkeley.edu/who\\_we\\_are/partners](https://ggsc.berkeley.edu/who_we_are/partners)

<sup>15</sup> <https://www.institute-for-mindfulness.org>

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## Transforming 21st-century Leader Competencies...

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## WE RECOMMEND

### **Schools of the Future. Defining New Models of Education for the Fourth Industrial Revolution World Economic Forum Report.**

This white paper is the outcome of a global consultative process initiated by the World Economic Forum's Platform for Shaping the Future of the New Economy and Society to identify promising models of high-quality education for the age of the Fourth Industrial Revolution. It is the first output of the Forum's Education 4.0 initiative, which aims to catalyze systems change by mobilizing a broad and innovative coalition of all relevant stakeholders around new models, new standards and new actions to transform the future of education.

Based on extensive community consultation, the first section of the white paper proposes a global framework for Education 4.0: eight critical shifts in learning content and experiences to redefine quality learning in the new economy. It provides a set of guiding principles by which to realize education systems in developed and developing economies alike – that more closely mirror the future of work, provide children with the skills to thrive in the new economy, and adapt to children's future economic and social needs. For economies in which education systems are lagging by today's standards, the Education 4.0 framework provides a vision to enable leapfrogging to the learning of the future.

The second section of the white paper illustrates 16 schools, school systems and educational initiatives that are pioneering aspects of the eight criteria and the transition to Education 4.0 globally. These examples – identified through a global crowd sourcing campaign in the second half of 2019 – may serve as inspiration for driving holistic and transformative action on this important agenda.

The final section of the white paper calls for public-private action to connect, scale and mainstream these promising new models, standards and approaches, and ensure access to Education 4.0 for all.

*An excerpt from the Introduction.*

More information at <https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution>





## Despite – on Individual Learning Experiences in the Retrospective Accounts of Adults

Zofia Szarota\*

### Abstract

The purpose of the paper was to expand theoretical andragogy resources by identifying the characteristics of the lifelong educational behavior of adults aged 50 years or more. Attempts were made to:

- 1) identify the subjective perspective on educational experiences in the aspect of activity stimulants and reducers,
- 2) gather knowledge about what determines the choices regarding the place and form of learning in adulthood, the success and difficulties experienced by the participants,
- 3) establish shared characteristics of education management experiences and educational competences in the unique individual conditions of personal memories.

The goal of the multiple case study was to explore educational careers from the subjective perspective of the participants (analytic generalization). Considering contextual knowledge, four types of educational careers were identified and described: Autonomous Autodidactic (autotelic, intellectual and utilitarian motivations), Ambitious (social and utilitarian motivation), Diploma Collector (utilitarian and social motivation) and Anchored Conqueror (social, promotion-oriented, utilitarian motivations). The following learning styles were identified: sequential (the closest to the traditional one), non-linear, patchwork-like (mosaic-like) and insular, as styles of new learning – from everything and from everyone, learning in daily life.

**Keywords:** learning in adulthood, managing one's own education, multiple case study, educational careers of people aged 50+ years, typology of educational career types

*Learning is a lifelong process. It is connected with personal, social and professional development as well as overcoming our weaknesses and lifting the motivational barriers and barriers to act. The analyses focused on the lifelong educational experiences of four people born in the 1960s. The study participants graduated from high schools and universities later than scheduled, took part in extracurricular educational activities and pursued their hobbies. They achieved all this while maintaining a number of concurrent social and professional roles. This study presents their different educational paths, motivations, and learning strategies. The recognized theories of adult educational activity date from the second half of the 20th century. The awareness that the sociocultural and economic conditions today have changed was the impulse behind the attempt to contribute to the theoretical resources on andragogy (elements of adult education theory) through the inductive generation of characteristics typical of lifelong educational behavior and to suggest new types of educational careers for adults.*

### Life as an educational space

Growth processes are connected with educational processes. They are immanent and universal elements of the life process of an adult. The theoretical descriptions of adulthood fall within auxological, axiological, sociological, biographical and educational paradigms (Dubas, 2009, pp. 133–135), and are linked to the main idea behind andragogy – lifelong learning. The personal functions of adult education, which are important from an individual aspect, have the neoliberally rooted task of developing intellectual capital to serve economic growth (cf. Jurgiel-Aleksander & Jagiełło-Rusiłowski, 2013, pp. 67–70) and of promoting humanistic values, cultural awareness and cultural expression (Council Recommendation, 2018). Thus construed, the lifelong learning process has competence-related and emancipatory functions. It is responsible for acquiring knowledge and skills which are useful not only in gainful employment. It

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brings the anticipated effects in the form of social welfare, better social and professional situations, and civic participation. When multiplied, competencies autonomize an individual and free them from the tensions which are connected with decisions requiring flexibility, responsibility and agency as well as with activities helping one to maintain pace with economic, business and sociocultural change.

Personal growth and career building is largely assisted by skills acquired informally. The modern labor market prefers swift learners who seek the expected qualifications on their own. Such qualifications may be valued equally to those acquired through an institutional teaching process (competence validation) (Solarczyk-Szwec, 2013). Engaging in activities related to self-education is a desired characteristic and competence of an adult.

There is no legal obligation in the neoliberal socioeconomic order that would force adults to attend a school or a course. Educational options emerge in response to the needs of the labor market, the economy, political ideology and, less so, political correctness. Adult education is a kind of “voluntary obligation” (oxymoron intended) which results from the significance of the credentials<sup>1</sup> confirming one’s qualifications required for one’s free activity, such as in the labor market.

Educational commitment is the outcome of the factors of participation established by Roger Boshier in a study involving 233 randomly selected education participants from three institutions. The result of the study is reflected in the list of 14 factors of participation presented in Table 1 (Boshier, 1971, as cited in Liodaki & Karalis, 2016).

The 20th century theories on the educational activities of adults<sup>2</sup> discussed how far individual factors contributed to building a person’s educational commitment. These factors included: social stratification; current needs; educational experiences in one’s biography and how they influence the decision on whether to start or quit one’s education (educational activity

accelerators or reducers); self-esteem and the related attitude to education; environmental (family/professional) perception and interpretation of education as a value; current situation in life and transition periods; expectations related to educational participation and its consequences; knowledge about educational institutions (cf. Malewski, 1998; Solarczyk-Ambrozik, 2009, pp. 192–196).

K. Patricia Cross (1981) identified three barrier categories: situational, dispositional and institutional. She associated situational barriers with one’s situation in life at a given time, for example an unemployed person may be unable to reskill due to a lack of funds. She linked dispositional barriers to self-perception and to how individuals define themselves as students. For example, someone may believe they are too old to start a course. The third category specified by Cross applied to the institutional barriers resulting from the organizational limitations of educational institutions; for example, a course schedule inconvenient for the learner (Cross, 1981).

Learning is usually understood as a process. Still, occasional, mosaic-like or sequential episodes or even incidents also entail certain experiences. Each of them may become an educational experience provided that it is given such a meaning by the participant. According to Alicja Jurgiel-Aleksander (2013, pp. 15–55), educational experience can be considered as: a tool to rationalize an individual’s functioning in the socio-economic system, an activity naturally incorporated in human life, and a commitment of an adult to social (also educational) practices.

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### Study objective and method

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The study focused on the educational experiences of individuals born in the 1960s, with their beliefs as to the causes, paths and personal consequences of their lifelong educational activity presented from a current, subjective perspective. An interpretative paradigm was applied.

**Table 1. Factors of participation**

1. Social Welfare	8. Cognitive interest
2. Social Contact	9. Educational compensation
3. Other directed professional advancement	10. Social sparing
4. Intellectual recreation	11. Television abhorrence
5. Inner-directed professional advancement	12. Social improvement and escape
6. Social conformity	13. Interpersonal facilitation
7. Educational preparedness	14. Education Supplementation

Source: Boshier, 1971, as cited in Liodaki & Karalis, 2016, p. 52.

<sup>1</sup> The value and potential of an employee are determined by their diploma and degrees (*their credentials*). For more see: Collins, 1979.

<sup>2</sup> For instance: H. Miller (1967) – Force field concept/Hierarchy of needs theory; R. Boshier (1971) – Personality symmetry model/Congruence model; K. Rubenson (2010) – Expectancy-valence paradigm/Force field theory of 1977; K. P. Cross (1981) – Chain-of-response model; V. McGivney (1993).

The objective of the study was to expand theoretical andragogy resources by generating the characteristics typical of the lifelong educational behavior of adults (analytic generalization)<sup>3</sup> (Yin, 2009, p. 52). Attempts were made to:

- 1) identify the subjective perspective on educational experiences in the aspect of activity stimulants and reducers,
- 2) gather unique knowledge about what determines the choices regarding the place and form of learning, the success and difficulties experienced by the study participants,
- 3) establish common features, if any, of experiences connected with educational career management in the unique individual conditions of personal memories.

The following questions were asked:

- 1) How did the educational careers of the participants progress?
- 2) What meanings did the participants give to their own educational processes and experiences?
- 3) What are the common factors for the educational careers of participants born in the 1960s?

The study was conducted as an explanatory multiple case study. This method makes it possible to compare various unique, untypical cases and is applied when exploring questions of how and why a certain phenomenon occurs (Yin, 2009, p. 61). The interview was semi-structured, in-depth and focused on the participants' memories regarding their educational activities during the 30 plus years of their adulthood.

The participants were born between 1960 and 1969. They did not know one another. Several people invited to the study refused to participate or withdrew.

The final criterion of the purposive sampling was educational activity as an integral component of the lifestyles of two women and two men. The participants had similar the demographic, cultural and psychological characteristics – age, lifespan stage, social origin etc. (Giza-Poleszczuk, Marody, & Rychard, 2000, p. 32). Shared features of the participants: aged 50 to 57 years during the study, higher education, good financial standing, recurrent education,<sup>4</sup> awareness of the compensatory function<sup>5</sup> of adult education, desire to learn and grow.

Two to three sessions were conducted with each participant. The duration of each session was 1 to 1.5 hours. The purpose of the first part of the meeting, which lasted approx. 20 minutes, was to explore general questions. The point of this part was to establish the commitment of the participants to the analyzed issue, and to identify any areas important from their perspective which might shed a new light on it. The participants discussed their childhood, adolescence, families of origin and schools. Subsequent sessions were longer and involved reconstruction of the learning process in adulthood. At the end of the interaction the past was merged with the present to assess the effects of the activity on the current situation. Interview stages were based on the interview guide: leaving the family home (either symbolically<sup>6</sup> or actually), initial life choices; the first “adult” education; intervals, subsequent educational processes and episodes, their causes; failures, burdens, costs of learning; successes, victories as a result of learning; areas of the self-learning activity; and giving meaning to educational events from a lifelong perspective. The interviews were transcribed. Only the content which correlated with the purpose of the study was analyzed.

**Table 2. Characteristics of the participants**

Respondent	Age of receiving master's degree/program	Job status	Age (years)	Place of living – type/population
M1	36/full-time	self-employed	57	province capital (population of 800,000)
M2	39/part-time	retired	52	local capital (population of 10,000)
W1	26/part-time	educator, career advisor	56	local capital (population of over 84,000)
W2	31/part-time	university teacher	50	local capital (population of 18,500)

Source: author's own work.

<sup>3</sup> “Using a case study in an empirical study leads to conclusions that help confirm, reject or modify the theory based on which the study was designed. Actually, just one case contradicting a theory may be enough to deny certain precisely formulated theories.” (Perry, 1998, as cited in Zaborek, 2007).

<sup>4</sup> In adult education theories, recurrent education is also referred to as “second-chance education.” The essence of the term comes down to an adult being able to resume their education, even a long time after leaving it; this is connected with the openness of educational paths.

<sup>5</sup> The compensatory function means a kind of compensatory alphabetization to supplement and grow one's knowledge and to model new skills and social competencies.

<sup>6</sup> Understood as taking on roles assigned to adults by the social environment but to a limited extent, e.g. starting one's own family while sharing the household with one's parents, financial dependence (cf. Wojciechowska, J., 2004).

### Structural determinants of education

During the childhood and adolescent years of those born in Poland in the 1960s, education was already compulsory (Pyter, 2015, p. 113).<sup>7</sup> The desired model of education was vertical, while for a professional career it was linear development within one's profession, spread over time, through a laborious process of gaining experience and reaching mastery. The adult education system worked well in its surrogate form as there were numerous – evening, part-time, extramural, correspondence or even radio & TV – schools for adults, including (according to encyclopedias) the Farming Technical Secondary School (1970–1990), the Radio & Television Teaching University (1976–1992), as well as part-time and evening higher-education programs for those who worked. Finding a job was not a problem as unemployment was latent. Subsidized by public workplaces, the professional upskilling and training system was where adults pursued their cognitive activity. There were plenty of non-school educational forms overseen by the state other than courses, such as teaching programs, general-access universities and, to a lesser extent, folk universities and universities of the third age (starting from 1975). However, higher education was an exclusive commodity, with access to universities and higher education schools limited to those with very good admission test results. For a long time, higher education was a privilege, involving just 6.5% of adults (data from the National Census 1988).

The participants received formal education in the People's Republic of Poland. The youngest of them took her secondary education exam in 1987. Their early adulthood was a time of system and economic transition – they were 21 to 29 years old between 1989<sup>8</sup> and 1990.<sup>9</sup> They came from a generation of people who played with their colleagues without their parents' supervision, with the house key around their necks, without access to foreign language courses, tourism or foreign travel. "For many of them it was not until they became adults that they faced the need to learn the missing skills, such as foreign language skills, and to upskill" (Marianowska, 2018, p. 98).

"In the early 1990s, lifelong learning became a central concept in adult education [...]. Instead of focusing on professional scientific knowledge, the lifelong learning concept starts to promote informal experience as a source of knowledge" (Wojciechowska, Z., 2018, p. 90). The 1990s disorganized the adult education system in Poland (Szczepeński, 1996,

pp. 9–10), with its almost complete privatization. Educational services became an expensive commercial product. This was a time of critical transformations in higher education. These involved a rapid growth in the number of non-state higher education schools.<sup>10</sup> The percentage of Polish people with higher education skyrocketed. The 2002 National Census showed that over 10% of the population had higher education, 17% in 2011, and 26.4% in 2017 (Polish Central Statistical Office – GUS, 2018, p. 166).

In 2004, the year when Poland joined the European Community, the participants were 36 to 44 years old, middle aged.

### Educational careers – multiple case study

The study material made it possible to describe the educational paths of the four participants, identify their critical memories, and capture the dominating causes of their educational commitment. The application of analytic generalization led to identification of the learning types and educational career types. This part presents the educational processes and episodes presented by the participants.

**M1 57** came from a family with an average and stable financial standing. He did not pass the secondary education exam at the high school of his choice, because he was more interested in the cultural life of a big city than in school. He became a father at the age of 21. To be able to support his family financially, he found a job and he passed the secondary education exam at a high school for adults. He concurrently graduated from a course for car mechanics and gained a professional driving license. He never utilized these qualifications in his work. His employer referred him for a part-time university program in a city 80 kilometers away. He quit after one semester. Six years later he took a high-intensity summer course in a foreign language. He simultaneously participated in an amateur theater group and developed his passion for photography. A year after completing the foreign language course he passed the admission tests for a university philology program with the top result. He was 29 and had family obligations. The decision to enroll was approved by his wife. During the studies, while he was inactive on the labor market, he received a scholarship. He compensated his family for his lack of regular income with the money he made during seasonal summer jobs in the countries of Western Europe. After graduation, he tried various jobs, but they limited him and failed

<sup>7</sup> Compulsory education was introduced in 1944. The school reform initiated by the Polish Parliament Act of July 15, 1961 introduced free-of-charge 8-year elementary schools nationwide: "[...] education and upbringing were to be one of the primary leverages of the socialist growth of the People's Republic of Poland. The purpose of the educational and upbringing system was to prepare qualified workers for the national economy and culture – conscious builders of socialism" (Pyter, 2015, p. 113).

<sup>8</sup> System transition – Round Table, Parliamentary election of June 4, 1989.

<sup>9</sup> 1990 – economic reforms known as the Balcerowicz Plan.

<sup>10</sup> There were 128 universities in the 1992/93 academic year, 18 of them being non-state universities, while in 2010/2011 the numbers were 470/328 respectively (Szarota, 2012).

to bring him satisfaction. He took an opportunity to do an enological internship in one of the European regions. His qualifications were ineffective in Poland at that time, as society was not ready for sophisticated consumption models. He completed two separate license courses (see: Litawa, 2006, pp. 61–62) necessary at that time to practice regulated professions (315 and 260 hours respectively). As a graduate, he pursued an individual career and worked with clients interested in his services. He registered as a sole trader at the age of 38. Self-employment was a source of satisfaction and income. At the age of 46, he completed another qualification course, allowing him to work in the industry and company of his choice. He paid for the courses with money from his household budget. As a result of an unemployment episode, he decided to take an offer from a job agency and complete another foreign language course, financed from the European Social Fund. He prepared for the national exam with the additional assistance of a native speaker. He passed the exam with a very good result. He polished his language skills through self-learning at home. Remaining self-employed, he took obligatory exams every year, subjectively assessed as bothersome, but they were the prerequisite for continuing to do business with the company of his choice. While discussing those exams, he said that he had been “extremely put off by the matter, completely uninterested in the content, and had felt under pointless duress.” Informal learning, on the other hand, done for pleasure, was an integral part of his life. “Actually, I don’t feel like I’m learning.”

**M2 52** came from a family with an average financial standing. He graduated from a vocational school as scheduled. He lost his mother while serving in the military. Her death was a traumatic experience for him, especially since his father was in a relationship with another woman and lived in a city far away. After his military service, he took a job in a car garage. He started a long-term relationship with a woman who worked for the uniformed services. Encouraged by her, he passed his secondary education exam at a high school for working adults. He got a job in the same place as his partner. Wanting to prove his intellectual capacity to her (as she was promoted to an officer rank) and to their colleagues, he started a part-time university program in a province capital, several dozen kilometers away. After he failed the exams, he changed the major of his master’s program. He graduated with a very good result at the age of 39. He had a very high opinion of his studies, he believed they had helped him grow. He also took part in a number of upskilling events organized by his employer, he referred to them as “training.” He started an informal relationship with a woman whom he met while studying. He described that relationship as very intense. He said that his partner had opened new perspectives for him, “he started to look at the world through her eyes.” He harnessed the micro worlds he was discovering by using his newly acquired competencies, he stated in the interview that the relationship had helped him

broaden his horizons: “I had to run to keep up with her.” Immediately after the studies, he started a two-semester (full-time) postgraduate course in a province quite far away. Once he received a diploma, he was promoted to a managerial position. He completed another postgraduate course, required of management. Despite that, he was unable to get along with his subordinates. “They were acting up, they envied me.” To compensate himself for his failures, he developed pastimes. He focused on social activities and self-learning. He started to organize foreign trips and go on them together with an association, of which he had become the leader. He was passionate about photography and pursued several other pastimes, including angling, skiing and mountain biking. Disillusioned with his social and professional reality, he retired. He started to work as a teacher at a local school. He thoroughly prepared for the classes. However, the students showed no interest in the material so, discouraged, he quit. He started to build a house, he took up apiculture, kept exotic birds and grew garden plants. The participant’s numerous spontaneously emerging interests can be treated as episodes which broadened his competencies for the time being.

**W1 56** came from a family with a stable financial standing. She passed the secondary education exam as scheduled and enrolled in a full-time university program in a city about 100 kilometers away. She quit before end of the first semester because she married and had a baby. Two years later, she started a part-time university program with a different profile. During the studies, she gave birth to another child. She combined her family obligations with her studies, which failed to give her satisfaction as they were “a disappointment as the specialty had no job-related advantages.” After receiving a master’s degree, she started a full-time job. As a teacher, she upskilled through workshops, in a self-learning team. She completed annual courses – one qualification course and one upskilling course. Once the education legislation changed, she was no longer permitted to work as a teacher – this applied to her subject. She felt that her colleagues treated her new position as a dormitory supervisor as a demotion. Among teachers of school subjects, a dormitory supervisor, an after-school club supervisor or a teaching librarian have a lower status than regular educators. They made it clear to her, and she felt like a second-class employee. She wanted to have her own professional identity, she invested in an expensive make-up artist course, which aligned with her interests. She really felt “the small-town mentality of the place where she lived.” While commuting to Warsaw, she made plans connected with a service business. A lack of clients prevented her dreams from becoming reality. Women in Poland were not ready for what she had to offer. And so she stuck to the teaching profession, she attended workshops, conferences etc. Around the age of 40 she was promoted to the highest teaching rank. At the same time, she developed her interests in esotericism, becoming a numerology and tarot

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expert. She did not present her skills to strangers, her hobby was her secret. To fulfill the teaching load requirements in terms of hours, she worked in several places. She worked temporarily with the local job agency, where she taught “self-presentation techniques and make-up art.” When she was 40, she was diagnosed with a tumor. She overcame the disease. She completed a 3-semester post-graduate qualification course. She was dismissed at the age of 45. This was tough for her. She brought an action in a labor court and found a part-time job in another city. “The library job was just temporary.” Once she won in court, in order to preserve the continuity of employment, she took a job inconsistent with her qualifications as an after-school club supervisor. “I didn’t care, I just wanted a full-time job. I turned out to be good at it. I was strong, I was creative.” She joined a trade union, expecting protection against the autocratic decisions of her superiors. She sees this as a pragmatic episode. She started another postgraduate course. At the age of 49, she became the school counselor. She succeeded, winning the respect of students, colleagues and superiors. She returned to her teaching duties, putting a lot of effort into preparing the classes. When she was 50, she enrolled in another postgraduate course. “Just in case,” she said. Not knowing what else might happen to her professional group, she did not yet rule out another “diploma collecting” commitment, as she described her educational path. Lifelong learning was her “insurance policy, reskilling addiction, a neurotic habit of preparing herself for unforeseeable events. I am not becoming a specialist; I need to keep reskilling. I have paper, but no competencies. It is a kind of hobby, a form of compulsion.”

W2 50 came from a family of modest means working on a farm. Her mother’s medical condition and her father’s alcohol addiction were not conducive to a happy childhood. She claims to have been brought up to work hard. She passed her secondary education exam as scheduled. She quickly married and had a baby. This led to 6 years of educational absence. She went to university when she was 26. While she was in her second year, she started to work (dormitory supervisor). She commuted to a province capital for her weekend classes. She had trouble reconciling her duties as a mother with her student and employee obligations. She paid for the studies from her earnings, and sometimes her mother supported her. Despite one failed exam, which shook her self-esteem, she had the highest GPA in her year. Motivated by her master’s thesis supervisor, she decided to write a doctoral dissertation. She completed a postgraduate course and started a job as a special education teacher. She worked additional hours at a university branch. This was where she had an opportunity to interact with and consult researchers, ask questions. She was very tired at that time – she had her regular job on weekdays, her teaching job based on an independent contractor agreement at the university during weekends, and every month she had to attend consultations for her

doctoral program in Warsaw, which was far from her home. She severely felt the burden of commuting, “I always lived very far from big cities. Schools on weekdays, university job during weekends, monthly consultations within the doctoral program, studying for my doctoral exams... Winter! Train, ice-covered metal stairs, I’m running to make it, knowing my last bus home is at 11 p.m.” She took a job at a college. “I would read 15 scientific books at once.” At the age of 41, she decided to invest her strength and funds in high-intensity foreign language courses abroad. The cost of the courses was *astronomical*. She made the money for the courses by teaching classes for studies financed from EU funds. She gave up on any vacation trips and she spent all savings on language schools and fees for native speakers: “The courses were charged to my credit card, I paid them off by working overtime.” She spent 12 hours a week learning a foreign language: “I was so exhausted I wanted to cry. If it wasn’t for my inborn sense of responsibility, I’d have quit.” Unable to count on her husband for support, she divorced him. Health problems appeared. She was concurrently preparing for her post-doctoral program, which she completed successfully. She started to pursue an international career: “I’m setting more and more goals for myself, and due to my efforts, I can pursue my dreams. I’m carried by success!” She gave lectures and held discussions at foreign universities in a foreign language, the success made “the time, cabs, fatigue, back pains and bad atmosphere among colleagues” insignificant. She felt satisfied.

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### **Overcoming powerlessness – giving meaning to educational events**

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According to Elżbieta Dubas (2009, p. 137), growth during adulthood is dynamic and entails crises, especially during “breakthroughs” in life and critical, often difficult personal and global events. Dubas emphasizes that development-related crises are not neurotic, destructive or pathological. They are growth opportunities as they bring the individual to higher development levels, even if sometimes through regression.

In the presented interviews, the participants showed the complexity of their educational careers. They identified their educational experiences, and certain sub-worlds. They presented their own motivations, gained insight into the consequences of their own choices.

M1 developed individually, horizontally, non-linearly but sequentially, consistently in terms of the areas of interest. His learning process was spread over decades. His goal was to perfect his specialization, while at the same time pursuing his interests. He considered his second attempt at the secondary education exam at the high school for adults as the hardest time. Becoming a husband and father early in life, he was forced to change his plans and to immediately find his way to adulthood and seek a job. He quit his first university program because he found it uninteresting. He describes the period of combining his job

with family duties and out-of-town studies as “dark, void of perspectives, with no future, robbed from his biography.” He experienced family tensions due to his living situation – not having his own place. It must be added that these events coincided with the period of martial law in Poland (1981–1983). When M1 was 27, he began a high-intensity foreign language course. He was inspired to take that step by his interest in the culture dominated by that language. The course helped him overcome his lack of faith in himself. This led to the decision to enroll at a university and helped him pass the admission test with the top result. The participant mentioned the negative consequences of the time spent during his early adulthood – the full-time university program pursued with a 10-year lag led to his inactivity in the labor market and to stagnation in his professional development, lack of financial independence and disrupted family relations. Financial dependency was very hard for M1: “due to the full-time university program, I was unable to make money.” After he graduated, he became a subordinate employee: [my employer] “had me do tedious work.” However, due to the studies and self-learning, he developed his skills, found self-fulfillment in an appealing job that matched his interests, experienced professional satisfaction, earned recognition from his clients and explored interesting tourism destinations. M1 invented his career, he had an idea around which he centered the process of improving his qualifications. He used educational possibilities other than formal ones to obtain a license to practice a specific profession, but he relied on self-learning for his self-growth (initially by reading books and journals, later by using the Internet and audiobooks). He was convinced that the system and economic transition from 1989–1990 came at least 10 years too late. “It will be better, easier for those born later. A different start, different conditions.” He plans to keep developing and expanding the areas of his professional activity. He was termed an Autonomous Autodidactic.

The education of M2 was mosaic-like. As he had no family support while building his professional position, he used the formal education resources at his disposal. Without solid educational grounds, he ambitiously built the components of subsequent diplomas. His educational shortcomings were the cause of his hidden insecurities. His motivation was built on ambition, perhaps even egotism. He looked at his reflection in the eyes of others and he wanted to prove his worth to the world. His educational activity was triggered by a social mirror, the competencies of his life partners, the desire to be a match for them. After graduating from a university, he used the upskilling forms available at his workplace. This was often a matter of chance. Social motivations kept taking him towards new interests, which he pursued informally. This allowed him to experience satisfaction from his own growth. By earning a master’s degree, which balanced his self-knowledge and self-esteem, he opened up to self-learning. M2 recognized his own potential, and as a consequence noticed the room for further

growth – he was proud of what he had achieved. He perceived the two-semester university program pursued at a ministry-managed higher-education school, obligatory for the desired promotion, as the hardest part of his education. He had bad memories from that time. He was annoyed with the excessive formal requirements, the “stress, the exam terror, the lack of respect for attendants, and the nonexistent knowledge of some professors.” The studies took place from Monday to Friday, they were marked by “strict discipline and barrack-like manners.” He suffered a serious injury during one of the classes and he had to undergo surgery. The diploma he received did not become a source of personal satisfaction, despite the promotion: “This was knowledge to learn by heart rather than put in practice, completely useless.” After retiring, he focused on his deteriorating health and new hobbies: “photography, nature observation, foreign travel, bicycle trips.” He explored new places and met new people. He learned to “listen to birds” and actively enjoy his free time. This style of educational commitment was termed Ambitious.

For W1 her learning process, despite some features of continuity, was mosaic-like, patchwork-like, often random. What W1 found the hardest in her education was the university program, also due to the material: “Not those studies! It was decided randomly, I had no information about the occupation.” Family obligations, enjoying her role as a young wife and mother kept her away from her studies. “The commuting took time away from my other duties.” W1 took any upskilling opportunity to avoid being jobless. “But youth gave me strength and courage for all the activities.” She did not hide her disappointment in what postgraduate education had to offer: “Some classes were methodologically unacceptable. We bought those diplomas, while those classes could have been taught differently.” She has bad memories of some episodes from her postgraduate course: “One professor merged groups, instead of in the classroom we would sit with her in a restaurant with her beer, supposedly alcohol-free.” Her motivation was initially utilitarian, later on she fought to keep her position in the professional group that she joined. Her “professional downfall,” as she termed her dismissal, took a toll on her. Despite seeing some of her educational experiences in a negative light, she did not lose her joy of learning. She pursued her individual interests in the free educational market and through self-learning. She identified self-growth opportunities, recognized her own potential, she was proud of her achievements when she was exploring her interests. She used a course completed as a hobby to make money. She like to learn. Her expectations included “social and family peace and professional fulfillment,” she wanted to have “time for her pastimes.” She stayed vigilant, looking for new educational options: “Despite everything and just in case.” W1 represents a style termed Diploma Collector.

W2 pursued her goals linearly, sequentially, vertically. She was guided by ambition: she completed a university program, a postgraduate course, a doc-

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**Table 3. Education models and educational career types**

Education models	Autonomous Autodidactic	Ambitious	Diploma Collector	Anchored Conqueror
Formal	<ul style="list-style-type: none"> <li>adult high school</li> <li>part-time university program</li> <li>full-time university program</li> </ul>	<ul style="list-style-type: none"> <li>adult high school</li> <li>part-time university program</li> </ul>	<ul style="list-style-type: none"> <li>full-time university program</li> <li>part-time university program</li> </ul>	<ul style="list-style-type: none"> <li>part-time university program</li> <li>doctoral program</li> <li>post-doctoral program</li> </ul>
Non-formal	courses: <ul style="list-style-type: none"> <li>car mechanic</li> <li>professional driver's license</li> <li>high-intensity foreign language</li> <li>two license courses</li> <li>qualification course</li> <li>second foreign language</li> </ul>	<ul style="list-style-type: none"> <li>continuous upskilling</li> <li>training</li> <li>postgraduate course at a ministry-managed higher-education school</li> <li>HR management postgraduate course</li> </ul>	<ul style="list-style-type: none"> <li>various obligatory and optional forms of upskilling</li> <li>qualification course</li> <li>upskilling course</li> <li>three postgraduate courses</li> <li>make-up artist course</li> </ul>	<ul style="list-style-type: none"> <li>postgraduate courses</li> <li>foreign language courses</li> </ul>
Informal	<ul style="list-style-type: none"> <li>amateur theater group</li> <li>downhill skiing</li> <li>travel</li> <li>foreign language self-learning</li> </ul>	<ul style="list-style-type: none"> <li>photography</li> <li>downhill skiing</li> <li>mountain biking</li> <li>organized tourism</li> <li>apiculture</li> <li>keeping exotic birds</li> </ul>	<ul style="list-style-type: none"> <li>esoteric knowledge</li> <li>interior design</li> </ul>	–
Learning style	<ul style="list-style-type: none"> <li>sequential</li> <li>horizontal</li> <li>non-linear</li> <li>for interests: patchwork-like</li> </ul>	<ul style="list-style-type: none"> <li>mosaic-like</li> <li>vertical</li> <li>for interests: patchwork-like</li> </ul>	<ul style="list-style-type: none"> <li>mosaic-like</li> <li>patchwork-like</li> <li>horizontal</li> </ul>	<ul style="list-style-type: none"> <li>sequential</li> <li>linear</li> <li>vertical</li> </ul>

Source: author's own work.

toral program, a post-doctoral program and language courses. She focused on her career but she invested the most energy and money in learning a foreign language. "I felt uncomfortable during the course because I lacked the vocabulary. I had problems understanding what was being said. A high absence level was the result of my professional duties. I felt like an idiot. I kept saying 'Could you repeat that please, because I don't understand.' I felt bad. The learning led to financial problems, fatigue, the hardship of commuting, deteriorating health, disappearance of social life and envy of the work environment." Educational experiences contributed to her self-growth, satisfaction and pride in her achievements, they allowed her to give lectures in a foreign language, resulting in the international recognition of her competencies: "It was worth it!" W2 made informed and appropriate choices when it came to the areas of her educational activity, she used the support of mentors to consistently improve her social and professional status, she kept repeating enthusiastically: "It's all ahead of me!" This type of educational career has been termed Anchored Conqueror.

### Shared factors of educational activity

Andragogy theories fail to align when it comes to describing a participant of educational events. According to Ewa Solarczyk-Ambrozik, "the image of

a learning adult (...) is constant. (...) A general profile of adult education participants emerges clearly" (2009, p. 183). In turn, Stephen Gorard (as cited in Golding, McDonald, & Malec-Rawiński, 2015, p. 62) claims that the participation of adults in learning processes is not differentiated by origin, family status, gender or age. However, the presented study helps identify certain shared characteristics. All the participants were born in 1960s and they were the first in their respective families to have higher education. They came from families of average or modest means. Their initial capital was poor: early birth of children or loss of a mother (when the participants were between the ages of 18 and 21), lack of gainful employment. This prevented them from preserving their educational continuity. In the interviews, they mentioned that their debut in adulthood had been "burdened." They had no support from their families of origin. Early adulthood was a difficult time for them, also financially. Each of the participants rationalized their functioning within social and professional circles. They successfully overcome the obstacles and proved they were able to cope with change. After some time, they returned to university studies. They participated in many forms of education. They chose adult schools and universities for their recurrent education, postgraduate courses, internships, workshops and traineeships, and consultations. This shows they were well aware of what the

educational market had to offer. They participated in education according to the technological models, they did not have neoliberal corporate careers (Melosik, 2018).

There were a number of contributing factors to their educational participation, including the desire to have higher education, which in turn catalyzed their subsequent cognitive activity. The participants made their educational decisions without any regard for their social security. They felt a need to learn and they satisfied it, with the cost to be repaid from their future success. Education was a value they desired, and they trusted that they would successfully tackle the educational challenges. Strong factors that triggered their educational participation included: people and groups treated as reference standards; the way the participants were seen by the environment; interpretation of education as a desired value; and a desire to climb up the social ladder. They built their educational careers while having a number of social roles, at great financial cost. They placed significant effort in gaining their diplomas. Each of the participants experienced an event (usually during university studies) which distorted the symmetry between their self-knowledge<sup>11</sup> and self-esteem (a failed exam, an unfair evaluation, incidents connected with unemployment). Despite that, they did not withdraw from their educational environments. These findings show a positive correlation with the existing andragogy resources.

The participants consciously guided their decisions, and anticipated their own future. However, the decisions were often random – based on opportunity, coincidence. They remembered the fatigue, financial problems, family disruptions at the beginning of their “adult” education, a feeling of being forced into the situation, and their determination in overcoming the barriers. They did not give up on growth, self-learning. They found their way during a difficult time of political and economic transition and in the reality of a learning society. The principle of credentialism may also apply to those experiences (Collins, 1979, pp. 191–204), reinforced by game theory in the case of W2<sup>12</sup> (Gromadzka, 2014, p. 202).

The ultimate profit that came from learning exceeded the experienced losses. They reached full satisfaction later in life, once they raised their professional and social status.

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## Conclusions

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Which of the andragogy-based adult educational activity theories may be used to describe the gathered material? The difficult Polish reality of the early

adulthood of the participants makes it impossible to rely on any contemporary Western theory. This is because of the cultural and socioeconomic differences typical of the Polish past and the transition costs. The andragogy paradigm shift from lifelong education to lifelong learning additionally requires caution in applying the findings of the 20th century theoreticians and researchers to the interpretation of modern individual learning strategies and styles.

The identified educational types (Autonomous Autodidactic, Ambitious, Diploma Collector, Anchored Conqueror) may be compared with the professional career patterns described by (1) Markieta Domecka and Adam Mrozowicki (2008, pp. 136–155) as: anchor-like, patchwork-like and structure-like career, and by (2) Danuta Urbaniak-Zajac and Ewa Kos: broken-through, linearly organized (steplike), arabesque-like (Urbaniak-Zajac & Kos, 2013, pp. 167–169).

The study helped establish a subjective perspective on the learning story of people in their fifties set in the context of the social relations and the places where it happened. While reconstructing the events, the study participants interpreted them (Urbaniak-Zajac & Kos, 2013, p. 95). In this way they gained insight into their own educational micro-worlds. The new learning, as we may call the style of insular learning from everything and from everyone, learning in daily life (see: Field, 2000) and non-linearly, is characterized by turning away from traditional educational institutions and systems. Having collected the required diplomas later than normally scheduled, in the face of credential inflation (Collins, 1979), the participants realized that a university education did not guarantee success in the labor market (Melosik, 2018). They recognized not having a university diploma as a clear excluding factor, but they also knew that the knowledge coming from lecture halls was not enough. They personalized the learning process and took advantage of their educational episodes and processes to build space for self-education, develop their social and professional careers and constitute themselves (cf. Mark, 2013). They learned outside the system, choosing forms and content, and obtaining certificates to prove their additional competences. They gave their experiences, including critical events, a cognitive meaning. They pursued utilitarian goals, so important in the culture of individualism, and they expected to be rewarded with profit, promotion and prestige. Brought up in a traditional education system, they found meaning in lifelong learning. By learning, they broadened and multiplied their own intellectual culture. The showed respect for knowledge and they gained the respect of their surroundings.

<sup>11</sup> Awareness of the determinants of one's own development and awareness of the methods of organizing that development.

<sup>12</sup> According to Monika Gromadzka: “The theory centers around a ‘player’ who analyses what behaviors will bring him or her profit or loss, and keeps applying this analysis to other ‘players.’ This way the player is in a way creating a game strategy – a complete action plan accounting for all potential scenarios [...]. The result of the ‘game’ is determined by the number and quality of the credentials gathered by the participants. And the reward is an attractive, satisfying, well-paid job” (Gromadzka, 2014, p. 202).

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# Shaping the Future of Learning.

## Some thoughts after the Online Educa Global conference in Berlin, 27–29.11.2019

*Maria Zajac*

Online Educa Berlin is a conference that attracts over 2,000 people from several dozen countries to the Intercontinental hotel every year. With such an impressive turnout, it is one of the largest conferences in Europe, and one of the most significant events focusing on the use of modern technologies in education and business training. It is also unique in that it has been held regularly for the past 25 years – always in the same city and around the same time, i.e. at the end of November or the beginning of December. The attendants are not discouraged by the short, dark days or by the November rain, nor by the substantial conference fee of almost 1000 euros. On the contrary, the atmosphere at the Intercontinental on those three conference days is always hot! A lot is happening, multiple sessions are held at the same time, there are numerous talks – both in the exhibition area and all across the conference space. It can definitely be said that anyone who visits Educa finds something to match their interests.

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### Topics and trends

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The main theme of this year conference was **Shaping the Future of Learning**. Thus phrased, the area of interest was broad enough to cover a considerable diversity of issues, but at the same time too general to deliver specific answers or solutions. This could be noticed during the plenary debate, which usually centers around a thesis starting with “This house believes that...” This year, the thesis that the debate participants were to either agree with or argue against was the statement: “an obsession with economics is harming education and undermining the skills for the future.” The guests invited to the debate always represent opposing views on the thesis – there are two supporters and two opponents. The premise was similar this year but the difference of opinions during the debate turned out to be relatively blurred, and the presented notions were neither particularly controversial nor inspiring. I had a feeling that this year’s debate was disappointing. First and foremost, its description, which – as could be expected – reflected the assumptions of the organizers, previewed a completely different distribution of accents, or even a different starting point for the discussion. The question in the description

was whether modern educators should focus more on developing the skills and competencies defined from the perspective of the current needs of the labor market, or whether the task of the education system should continue to involve shaping timeless, universal competencies to allow learners to adapt to the labor market also in a more distant time horizon. However, the question was not really addressed during the debate and as such, failed to clearly polarize the presented views. Actually, one could get an impression that the speakers were attempting to specify some more and less important areas where the economy impacts education systems in various countries rather than trying to convince the audience – and one another – about the validity of the thesis underlying the discussion. The closest to the topic of the debate was the speech of Olivier Crouzet from the Parisian Ecole 42 (School 42) where he highlighted the substantial interest on the part of the labor market, as measured by the number of job offers, for graduates of the avant-garde educational initiative for programmers that he was representing, already present in 18 countries.

The recording from the plenary debate was posted by the organizers on the conference home page in Publications (The OEB Debate), and it can be watched directly on the YouTube channel of the conference,<sup>1</sup> so everyone may follow the discussion on their own.

The plenary and concurrent sessions covered a number of issues already known and often present at conferences, such as: design thinking, artificial intelligence, and the use of virtual reality and augmented reality, or even holograms, in education. Substantial attention was devoted to the development of digital competencies and the competencies required in the digital era, and a lot was said about adaptive learning, about how to stimulate interaction and engage learners, and about apps that could effectively support the discussed educational endeavours and activities.

As far as the latest trends are concerned, the discussion about blockchain was noteworthy. It addressed the possibilities and usefulness of that technology as a carrier of information about the competencies and skills acquired by an individual, or even as a record of their whole academic education, including the diploma.<sup>2</sup> The issue of confirming the competencies

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<sup>1</sup> Link to the recording on the conference website <https://oeb.global/media#publications> and directly on YouTube: <https://www.youtube.com/watch?v=-WM8pS6Ywtk>

acquired through formal education kept emerging during Educa in various contexts, highlighted much better than during the said plenary debate. It was addressed in speeches about open credentials and open badges (I should mention here a very interesting free workshop held on the day before the conference, managed by Iłona Buchem, entitled “The Role of Open Credentials for Virtual Mobility of Students and Teachers – Enhancing Internationalization in the University of the Future”). An additional issue that appeared during discussion at that workshop was the distinction between the terms ‘Virtual Mobility’ and ‘Virtual Exchange.’ The former is usually understood as participation in remote courses, offered, e.g., by MOOC platforms, while the latter is related to the idea of academic exchange, known, e.g., from the Erasmus program, but pursued remotely, with students from various centers participating in courses offered on the platform of a particular university and moderated by the teachers of that university.

A strong statement was made by Jef Staes in his speech entitled “Social Validation, the End of the ‘Diploma Paradigm’” on the second day of the conference. He emphasized the positive role of “social assessment” in social media and juxtaposed it with the grades received during formal education, which, as he claimed, valued the ability to follow the rules rather than passion and talent, which were the prerequisites for the development of innovation and creativity. He tried to convince the audience that social validation and networking should be treated as methods to evaluate the skills and capabilities of an individual and, at the same time, as the basic tools for devaluation – and the resulting ‘deconstruction’ – of the notion of diplomas. The speaker has been a regular participant of the Berlin conference for years, and he has been trying to convince the audience that true change, both in education and in organizations, happens only if we give the floor to people with passion and talent instead of rewarding obedience and playing by the rules. Highly engaging and eloquent, his speeches attract the attention of listeners, even though they are seen as a kind of vision of a still distant future.

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### Participants

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According to official statistics posted on the Educa Berlin website, the turnout was above 2,500 people, who came from 70 countries from all regions of the globe. For understandable reasons, the participation is the highest for European countries – 82%. Out of the top ten countries with the most attendants, nine are from Europe, with the United States coming sixth, as the only non-European member of that group. Considering the activity of American companies in the area of modern ICT technologies, their presence, especially among the exhibitors, seems natural, or even obvious.

It should be noted that the Top 10 includes Poland; it may be last but this still shows that our country was quite well represented in Berlin, despite the small number of speeches given by Polish participants, as per the list of speakers.

In the context of geographic range, it is also of significance that Educa has inspired the creation of analogical events in other regions of the world over the past years, such as E-learning Africa, which in a way took some participants from that part of the globe. Despite that, Educa in Berlin still attracts a large group of people interested in the application of modern technologies in both education (44% of the participants) and business (38%) every year. Some of them are regular attendees. There is also a relatively big group of those who come once every few years to learn about new trends in the world of education and technology-assisted learning, believing that such a ‘periodic’ presence is enough. Besides these groups, the event attracts completely new participants every year, who are so impressed with the scale, scope and theme of the event that they become regular guests at the conference in the next years. Regardless of the motivation, the interest in Educa is not decreasing, even though attendance is no longer growing as spectacularly as it used to 10 or 15 years ago.

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### Speakers

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Due to its position and reputation, Online Educa Berlin attracts prominent speakers every year, both from the world of education and from business environments. This year’s major names included Gilly Salmon, Laura Czerniewicz and Inge de Waard. They are known for their innovative activity in support of online education and promotion of the idea of massive open online courses (MOOCs) and mobile learning. Most of them were at some moment in life connected with Open University UK, like speakers Alan Tait or Mike Sharples. Other regular speakers at Educa are: Steve Wheeler (known among other things from his blog Learning with “e”s), Richard Straub (the creator of the Global Peter Drucker Forum) or Jef Staes (owner of the consultancy company Red Monkey, Belgium). The list of speakers was very long (over 300 people) since the organizers made sure to encourage representatives of all education sectors to participate, including official bodies, such as the European Commission, and ministries from various countries, including Poland (Rafał Lew-Starowicz). Associations related to technology-assisted education, such as EADL, EDEN, and EADTU, also sent numerous representatives to the conference. What needs to be emphasized is the presence of speakers who, though not involved in education directly, devote a lot of attention in their journalist, artistic or research activity to analyzing the necessary and inevitable changes that will help better prepare young generations to life in the

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<sup>2</sup> The session devoted to blockchain in education is also available on YouTube: <https://www.youtube.com/watch?v=ZiWcaf8UKPw>

digital era. This group includes Bryan Alexander, Julian Stodd and Laura Overton, to name a few.

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### Exhibitors

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Ever since the first Educa Online conferences, exhibitors have formed a distinctive and integral part of the event. Those who participated in the initial meetings at the Intercontinental most likely remember how the area occupied by booths of companies that wanted to present their services dedicated to assisting formal education and corporate training kept growing every year. There even was a time when it seemed that the Berlin event was dominated by exhibitors, with conference participants having trouble passing through between the booths.

The exhibitors at the 25th Educa Online conference included leaders of the educational apps market, such as: *Kaltura*, *Panopto*, *Presentations2go*, *D2L*, *Docebo*, *Echo 360*, *Itslearning*, *Moodle* and *eThink*, *TechSmith* and *Turnitin*, *Questionmark*, and *ProctorU*. Their solutions for comprehensive learning management systems, tools for creation of educational content (especially videos) and ways of testing and engaging learners are generally known. What is noteworthy is the emergence of alternative ideas, often developed by small start-ups in response to specific needs of the university or the center where they originated. Major ones include *Digixam* from Sweden (an app for digital examination), *Moovly* from Belgium (a simple tool for making educational videos), and *eLearning* from Denmark (a cloud-based platform that permits organizing the learning process based on shared video materials and the related test questions). Another interesting – and free – app is *Acadly*, offered by a young programming company from India. As a response system, it permits active participation in a lecture and allows the teacher to follow the forms and scale of students' participation. A completely atypical app that also deserves attention is *Renaissance Learning* – created at the initiative of parents with the support of educators and scientists who care about developing the reading competencies of children and teenagers. The app not only provides access to almost 6,000 digital books, but also makes it possible to organize activities, formulate tasks and check knowledge, with parents and teachers able to follow the progress of its users. *Virtual Orator* by a company from the Czech Republic is an interesting example of how virtual reality can be used. The app allows one to prepare for public speeches in various conditions by letting them choose the venue and the duration of the presentation, and even enable questions from virtual listeners.

It must be emphasized that the presented choice is highly subjective and is determined by specific interests. Aside from the aforesaid education solutions, the exhibitors presented interesting, often niche solutions for business training, but I will leave this topic to those who are more versed in this area of application.

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### Pros and cons

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The list of topics addressed during the Berlin conference was very broad – after all, they were discussed at over 120 sessions. However, we can identify a number of issues that were covered multiple times and in many lectures. They include: learner engagement, personalizing learner experience and adaptive learning, instructional design, education 4.0 and education for the future, open resources and open credentials, serious gaming and gamification, neuroscience and brain-based learning, microlearning, learning with humanoid robots, artificial intelligence for teaching and assessment, videos and podcasts, virtual and augmented reality, security and personal data, students as digital changemakers, and accessibility and inclusive education. It should be emphasized that the majority of the above concepts are not new, but have been present both at Educa and at other conferences devoted to modern education and assisting technologies for years. There are only slight shifts, some topics disappear or are rephrased (e.g. “adaptive learning” in lieu of the previously popular “personalized learning”), emphasis changes (e.g. “learning experience” is pushing out “learning design” to emphasize the more active, subjective role of the learner), and new technological solutions emerge along with their advocates.

So, is the Educa conference in Berlin worth it? It definitely is. Primarily as an international forum that presents the latest technological solutions, the results of current research and projects devoted to education and training in the digital age, as well as new concepts and ideas in education. True, an attentive observer and listener will quickly notice that the changes that are proposed or discussed are not so rapid and so inevitable as the presentations and lectures sometimes suggest, and they are either repeated year after year as new ideas or their promotion requires persistence as it may take several years for the outcomes of certain endeavors to shine. Nevertheless, this does not change the fact that the Berlin conference is an excellent place to learn current trends and changes in basically all areas of teaching and training.

It is an opportunity to confront the problems we sometimes face in our own environment with those experienced by educators or coaches from other countries, universities or organizations. We might benefit from exploring them from a different perspective, capitalizing on the possibilities offered by the large international forum.

The relatively inconvenient time is a certain drawback – the short, usually dark and rainy days at the end of November and the beginning of December definitely do not encourage people to visit the capital of Germany at that time of the year, so I would like to conclude this brief account from Educa Online 2019 with a small suggestion for the organizers to consider another, more friendly season as an additional incentive for participation in subsequent editions of OEB Global.

# e-mentor

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### ABOUT THE JOURNAL

**E-mentor** is an academic journal published both in printed (in 1200 copies distributed for free) and in the open access electronic form. Throughout the last 14 years, it became a well-established peer reviewed academic journal, officially listed by the Polish Ministry of Science and Higher Education as one of the highest ranked (15 points) scientific journals. It is distributed to the numerous university libraries and other educational institutions, as well as to individual subscribers from academia and business. Due to the growing interest and number of submissions from other countries e-mentor is now becoming an international journal with certain editions published fully in English. Creating high quality, peer-reviewed content that is used by researchers, students and practitioners around the world remains our commitment and ambition.

### SUBJECT AREAS

Originally established as the journal on e-learning, e-business and knowledge management e-mentor now covers a much broader scope of topics. Issues related to the presence of ICT in education are no longer limited to e-learning at the academia. Any form of TEL, formal or informal, along with its lifelong dimension fits with the present scope of the journal. Teaching methods and programs could also be taken into consideration as well as the challenges that digital technology brings to the lives of individuals and the whole communities or businesses.

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