

EDUCATION MODEL FOR FUTURE

Marcin Fojcik¹, & Martyna K. Fojcik²

¹*Department of Computer Science, Electrical Engineering and Mathematical Sciences,
Western Norway University of Applied Sciences (Norway)*

²*Department of Humanities and Education, Volda University College (Norway)*

Abstract

The modern work environment requires many new abilities. Hence, there are often called 21st-century skills. It can be caused to the increasingly common use of digital tools or by more and more individualization (fitting) occurring in all aspects of life. These skills are not only subject-matter skills but auxiliary such as time planning, flexibility, ability to contact and discuss with others, social skills, etc. These skills are often called "hard" and "soft" skills. Many professions introduce these skills to help employees adjust to future changes.

All industries had to follow changing world, mainly from an economic point of view. Banking, manufacturing, tourism, hotel industry, and sometimes administration, medicine, and healthcare focus on customization. Doing work quicker and more flexibly in all these areas is essential. Unfortunately, education is one of the arenas more resistant to these changes. There are "traditional" exam forms, "traditional" lecture forms, etc. The pandemic has introduced changes, but now there is a great willingness (from teachers, administration, and some students) to return to the previous situation.

University is an old institution. There was a time when the university was used to individual development. There were units – students studied chosen subject in their own time and developed themselves in the desired direction (Humboldt University model). Most important was feeling like part of science society. After this, the following model – the French university, shows that students should learn to be a valuable element of the state. Students' feelings were not significant. Students can be treated as the "labor force". They learn to fulfill state expectations.

What university model is desired now? What university model is practical enough to give work knowledge and prepare for new challenges? Are some pedagogical theories better matched to unknown current and future abilities? What is essential for students, and what is vital to the state?

In this paper, we would like to discuss some of the possibilities of different university models and different pedagogical theories with a focus on flexibility and further self-development of students

Keywords: *21st-century skills, education model, pedagogical theories.*

1. Introduction

The development of Industry 4.0, the digitalization of everyday life, the post-pandemic effect on social issues, and the technological development of processes and practices in different fields are causing an increasing interest in Education 4.0 and skills for the 21st century (González-Pérez & Ramírez-Montoya, 2022; Syahril et al., 2022). "Technology is leading to massive changes in the economy, in the way we communicate and relate to each other, and increasingly in the way we learn. Yet our institutions were built largely for another age, based around an industrial rather than a digital era" (Bates, 2022, pp. 30).

Voogt et al. (2013) in their study argues that there is a consensus in public and private sector, to develop skills for present and future society, but the research show that these skills are poorly integrated and implemented in educational practice. "The sort of future-oriented change and development required by this shift [21st century] in institutional practices, programming, and structure will likely meet with significant resistance from comfortably entrenched (and often outdated) segments of traditional education and training establishment" (Thornhill-Miller et al., 2023, pp. 23-24). The idea of effective, flexible production and individualized service systems in the global economy that rapidly changes and greatly influences today's society challenges the educational learning model.

This paper aims to present different educational models that historically had been used and compare them to the 21st-century skills, learning theories and requirements of education for future work.

2. 21st century skills

"21st-century skills" can be described as an umbrella term with a broad spectrum of different skills (Chen, 2021). Those skills vary from one source to another, there is no consensus nor consistency in what skills to implement in such framework (Kocak et al, 2021; Mitsea et al, 2021) but the 21st century skills are often characterized as higher-order skills (Chen, 2021; Thornhill-Miller et al, 2023).

According to Raitskaya and Tikhonova (2019), at least nine frameworks for 21st-century skills have been developed. Yet, there are many combinations and approaches to the different frameworks. Kocak et al. (2021) researched seven skills as 21st-century skills: problem-solving, critical thinking, cooperativity, digital literacy, algorithmic thinking, creativity, and effective communication skills, and they proposed three models of the relationship between these skills. Raitskaya and Tikhonova (2019) propose "three major clusters of skills" (pp. 7), namely social and communicative skills, cognitive skills, and personal attributes and emotional intellect. World Economic Forum (2015) proposed 16 skills divided into three categories: Foundational Literacies (literacy, numeracy, scientific literacy, ICT literacy, financial literacy, cultural and civic literacy), Competencies (critical thinking/problem-solving, creativity, communication, collaboration) and Character Qualities (curiosity, initiative, persistence/grit, adaptability, leadership, social and cultural awareness). Battelle for Kids (2019) proposes a model visually represented as a rainbow with different components: Life and Career Skills, Learning & Innovation skills- 4Cs, Information, Media & Technology Skills, Key Subjects – 3Rs & 21st Century Themes. The 4C from Battelle for Kids stands for (1) creativity and innovation, (2) critical thinking and problem solving, (3) communication, and (4) collaboration (Syahril et al., 2022; Thornhill- Miller et al. 2023) and are quite like the "Competencies" from the report by World Economic Forum (2015).

In their study, van Laar et al. (2017) lists different skills associated with 21st-century skills while acknowledging that the emphasis is on the knowledge-based workforce with the essence to "put employees in charge of their own learning" (pp. 584). Due to the lack of a clear, universal definition of 21st-century skills, there is an expectancy of a natural or implicit understanding of what skills employees could need in their future work. But according to Suleman, there is an underlying assumption that "employers are undoubtedly aware of their needs. But is this a reliable assumption?" (2016, pp. 173). Suppose the context of the 21st-century skills is to get the students to be better equipped for work possibilities in the future. In that case, there is no chance of knowing exactly what skills would be needed since these possibilities do not exist yet (Bates, 2022). However, González-Pérez and Ramírez-Montoya argue further that: "It is necessary to analyze the curricula holistically to balance the various objectives of education with the soft and technical competencies" (2022, pp. 2). Every framework or strategy might shed some light on the topic, but predicting skills is a gamble with no clear solution. Even more, one could argue that if such a solution existed, it might differ from person to person, from situation to situation and from paradigm to paradigm.

3. Teachings paradigms

There are many paradigms of teaching. Some of the more famous are behaviorist, constructivist and cognitivist (Ertmer & Newby, 2013). These paradigms are described differently in different countries, depending on tradition, history, and the development of pedagogy and didactics in the area (Sajdak-Burska, 2013). In general, Behaviorism is based on the formation of expected student attitudes with the help of feedback. The goal is to form the desired knowledge (Skinner, 2011). The student is more passive, while the teacher is more active. Constructivism is based on the student's creative approach to learning (von Glasersfeld, 2000). Instead of passively receiving knowledge, the student is encouraged to be involved, act, develop, and solve problems. There doesn't have to be the only proper solution, but different solutions are possible depending on different expectations. Constructivism assumes students should learn by exploring the world, not just by listening to lectures and reading textbooks. As a result, students gain knowledge and practical skills to successfully deal with challenges at school and in life (Sajdak-Burska, 2013). Cognitivism assumes that the student is an active recipient of the information (Bruner, 1964). The learning process involves actively processing information and assimilating new knowledge. Cognitivism emphasizes the student being an active participant in the learning process, not just a passive recipient of information. The main goal of cognitivism is to develop students' cognitive skills, such as memory, attention, abstract thinking, analysis, knowledge synthesis, creativity, and problem-solving. Cognitivism also assumes students should learn based on understanding, not just memory.

The various paradigms appear to vary in degrees in different teaching models.

4. University educational models

There are many approaches to educating students. The best-known are the Humboldt model and the French model (Sajdak-Burska, 2013). The Humboldt model is an approach to education developed by German student Alexander von Humboldt in the early 19th century. This model focuses on an interdisciplinary approach to learning and on developing students' intellectual, moral and emotional personalities.

Features of the Humboldt model (Tomicic, 2019) include:

- **Interdisciplinarity:** The Humboldt model assumes that science should be based on a combination of different disciplines, such as the natural sciences, humanities, and social sciences, to increase understanding of the world.
- **Individualization:** The Humboldt model focuses on an individualized approach to learning, meaning that teachers must adapt their teaching methods to each student's needs and abilities.
- **Personality development:** The Humboldt model focuses not only on shaping students' knowledge but also on their personality development, including developing their intellectual, moral, and emotional abilities.
- **Critical thinking:** The Humboldt model encourages students to think critically and analyze information rather than accepting it uncritically.

The model stipulated that learning should be combined with practice to shape practical knowledge and professional skills. In the Humboldt model, the teacher acts as a guide to help students discover and shape their interests and talents. Also crucial in the Humboldt model was academic freedom, the freedom to educate and research without interference from authorities and other institutions. This paradigm aimed to create a society where freedom of learning and research is the basis for social and economic development.

A French model is a traditional approach to education that has developed in the French school system over the centuries. Features of the French model (Rüegg, 2004) include:

- **Centralization:** The French model focuses on the centralization of power in the education system, meaning that decisions about curriculum and teaching methods are made by central government bodies.
- **Structure:** The French model emphasizes structure, meaning teaching is organized around curricula and rigid lesson plans.
- **Examinations:** The French model uses examinations as a tool to assess students' progress and as a condition for advancement to the next levels of education.

These features of the French model have influenced the concept of education in many countries around the world, especially in Europe. As a result, modern educational approaches are often based on a combination of different elements of educational models, including the French model.

The Humboldt and French educational models are very different and differ in many aspects (Macfarlane & Erikson, 2021). Here are some of the most important differences between these models:

- **The purpose of education:** The Humboldt model assumed that the purpose of education was to develop an individual's personality and enable him to reach his full potential. In the French model, conversely, education aimed to ensure the teaching of the ruling class, which was to be an elite educated in the humanities and mathematical and natural sciences.
- **Curriculum structure:** In the Humboldt model, curricula consisted of various subjects, and students were free to choose the subjects they wanted to study. In the French model, the curricula were more centralized and based on divisions into departments and majors, with little freedom of choice.
- **Teaching methods:** The Humboldt model emphasized practical classes and exercises, and teaching was more individualized. The French model was dominated by lectures and seminars, and teaching was more centralized and focused on learning by memory.
- **Status of university teachers:** In the Humboldt model, academics were considered academic authorities. Their role was to inspire and provoke students to think and explore. In the French model, the teacher's role was to impart knowledge to students.

Although the two models are fundamentally different, they influenced the development of education worldwide. They played a crucial role in shaping the concept of the university. These models do not exist in their pure form but are after many transformations and evolutions.

5. Discussion and conclusions

What university model is practical enough to give work knowledge and prepare for new challenges? Are some pedagogical theories better matched to unknown current and future abilities?

The Humboldt model is based mainly on individual learning, using various methods and speeds. The goal is to expand one's knowledge. Each student does this in their own way, learning and being in an academic environment - through conversations, discussions, polemics, research, lectures, etc. The student chooses the paradigm independently.

The French model's primary goal is to provide the expected (central) skills for a large segment of population. Individual objectives and values are less important. The paradigm of behaviorism is often used - reinforcement of desired (socially and politically) behavior.

21st-century skills mean not specific measurable skills but more qualities such as preparing to solve a problem, cooperating, talking, and planning time and resources. Therefore, behaviorism, which focuses on repeating specific behaviors, may not be considered an appropriate teaching model for 21st-century skill development. Instead, more relevant are constructivist or cognitivist paradigms. These paradigms, in turn, require different preparation, i.e., teaching and learning.

"Traditional educational approaches cannot meet the educational needs of our emergent societies if they do not teach, promote, and assess in line with the new learner characteristics and context of the 21st century" (Thornhill-Miller et al., 2023, pp. 23).

The Humboldt and French models exist as a virtual reference points. In today's world, there is no way to return to the times when a student used as much time as he wanted to assimilate knowledge. In turn, the model of educating everyone equally provides the knowledge needed in the near future. It is (and will be) necessary to change the way of teaching, focusing more on individuality, critical thinking, creativity, and problem-solving cooperation and less on hearing, memorized learning, and instruction-based work.

References

- Bates, A. W. (2022). *Teaching in a digital age: Guidelines for designing teaching and learning* (3rd ed.). Tony Bates Associates Ltd. <https://pressbooks.bccampus.ca/teachinginadigitalagev3m/>
- Battelle for Kids (2019). *Framework for 21st Century Learning Definitions*. https://static.battelleforkids.org/documents/p21/P21_Framework_DefinitionsBfK.pdf
- Bruner, J. S. (1964). The course of cognitive growth. *American psychologist*, 19(1), 1-15. <https://psycnet.apa.org/doi/10.1037/h0044160>
- Chen, D. (2021). Toward an understanding of 21st-century skills: From a systematic review. *International Journal for Educational and Vocational Guidance*, 1–20. <https://doi.org/10.1007/s10775-021-09511-1>
- Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance improvement quarterly*, 26(2), 43-71. <https://doi.org/10.1002/piq.21143>
- González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: systematic review. *Sustainability*, 14(3), 1493. <https://doi.org/10.3390/su14031493>
- Kocak, O., Coban, M., Aydin, A., & Cakmak, N. (2021). The mediating role of critical thinking and cooperativity in the 21st century skills of higher education students. *Thinking Skills and Creativity*, 42, 100967. <https://doi.org/10.1016/j.tsc.2021.100967>
- Macfarlane, B., & Erikson, M. G. (2021). The right to teach at university: a Humboldtian perspective. *Educational Philosophy and Theory*, 53(11), 1136-1147. <https://doi.org/10.1080/00131857.2020.1783245>
- Mitsea, E., Drigas, A., & Mantas, P. (2021). Soft Skills & Metacognition as Inclusion Amplifiers in the 21st Century. *International Journal of Online & Biomedical Engineering*, 17(4), 121-132. <https://doi.org/10.3991/ijoe.v17i04.20567>
- Raitsjaya, L. & Tikhonova, E. (2019). Skills and competencies in higher education and beyond. *Journal of Language and Education*, 5(4), 4-8. <https://doi.org/10.17323/jle.2019.10186>
- Rüegg, W. (Ed.). (2004). *A history of the university in Europe: Volume 3, Universities in the nineteenth and early twentieth centuries (1800–1945)*. Cambridge University Press.

- Sajdak-Burska, A. (2013). *Paradygmaty kształcenia studentów i wspierania rozwoju nauczycieli akademickich: teoretyczne podstawy dydaktyki akademickiej. Teoretyczne podstawy dydaktyki akademickiej* [Paradigms of student education and of support for the development of academic teachers. Theoretical basis of academic didactics]. Oficyna Wydawnicza "Impuls".
- Skinner, B. F. (2011). *About behaviorism*. New York: Vintage Books.
- Suleman, F. (2016). Employability skills of higher education graduates: Little consensus on a much-discussed subject. *Procedia – Social and Behavioral Sciences*, 228, 169-174. <https://doi.org/10.1016/j.sbspro.2016.07.025>
- Syahril, Purwantono, Wulansari, R. E., Nabawi, R. A., Safitri, D., & Kiong, T. T. (2022). The Effectiveness of Project-Based Learning On 4Cs Skills of Vocational Students in Higher Education. *Journal of Technical Education and Training*, 14(3), 29-37. <https://doi.org/10.30880/jtet.2022.14.03.003>
- Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J. M., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., El Hayek, S., Augerau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D. & Lubart, T. (2023). Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. *Journal of Intelligence*, 11(3), 54. <https://doi.org/10.3390/jintelligence11030054>
- Tomicic, A. (2019). American dream, Humboldtian nightmare: Reflections on the remodelled values of a neoliberalized academia. *Policy Futures in Education*, 17(8), 1057-1077. <https://doi.org/10.1177/1478210319834825>
- van Laar, E., van Deursen, A. J., van Dijk, J.A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in human behavior*, 72, 577-588. <https://doi.org/10.1016/j.chb.2017.03.010>
- von Glasersfeld, E. (2000). Problems of constructivism. In L. P. Steffe & P. W. Thompson (Eds.). *Radical constructivism in action: Building on the pioneering work on Ernst von Glasersfeld* (pp. 3-10). Routledge.
- Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of computer assisted learning*, 29(5), 403-413. <https://doi.org/10.1111/jcal.12029>
- World Economic Forum (2015). *New Vision for Education: Unlocking the potential of technology*. BC: British Columbia Teachers' Federation. https://www3.weforum.org/docs/WEFUSA_NewVisionforEducation_Report2015.pdf