

Technology, People and Processes in Universities in 2025: Is BYOD the Solution?

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Abstract: In recent years Technology has been putting enormous pressure on higher education. The change has been being felt since the nineties and it became radical with the COVID-19 pandemic and the rise of artificial intelligence as ChatGPT. That change was felt among everywhere in the classroom which is our main unit of research. In this paper we describe that change and then analyse it within a conceptual analysis on the current situation and in the scope of three models of analysis; Bring Your Own Device – BYOD, Technology People and Processes - TPP and Head Hand Heart - 3H. We include other known ideas on Knowledge Management like those related to the types of knowledge logic, emotional and spiritual. In order to substantiate our findings, we perform a small Literature review using the SCOPUS database and known data. We conclude that the sharp and deep technical evolution poses a big challenge for higher education and that only if the Hand will be used intensively, the organizations will fulfil their mission in full – this conclusion brings into question the use of technology in the classroom. In this context, Bring your own device seems to be a very important model. However, its success is only guaranteed in higher education if coupled with a sound and wise application of the TPP model and of the 3H model. This idea put much responsibility on the lecturers but also on the students for the success of the institutions themselves. This idea is somehow original in the current times in which technology dominates the discourse. The paper is limited because we would need more empirical evidence to base our intuitions.

Keywords: Higher education, Knowledge management, BYOD model, TPP model processes. 3 H model

1. Introduction

This paper is written from the point of view of a university lecturer. Its aim is to analyse the introduction of technology in the classroom, put this fact into the current context – namely 2025, within a globalized economy, with internet, after the COVID-19 pandemic, and with massive Artificial Intelligence developments such as ChatGPT and try to derive some insight into future.

We believe that a good way to present the problem is to go a bit down memory lane. Therefore, we divide the timeframe into four parts: 1) early 20th century, 2) late 20th century, 3) early 21st century and, 4) the last years. Namely:

1. In most of the 20th century classes were somehow dull places. Students would use pen and paper to take notes. They could distract others by trying to speak with them, pass paper notes, or write on the colleagues' notebook. Students sitting in the last rows could have more freedom and be more difficult to control by the lecturers. What we will call external isolation was total because while in the classroom students and lecturers would not be in contact with the outside world. Also, internal isolation was very significant because it was difficult to contact other classmates – apart from using the paper notes.
2. Things began to change in the last decades of the 20th century when mobile phones were invented. At first only a small number of lecturers and students used them. Also, in the last two decades of the last century, devices such as the Walkman and the MP3 made it possible for students to hear music by themselves but the utilization of these mechanisms in classrooms was usually strictly forbidden. Therefore, the ambience could be cheerful but usually was quite boring and students continued to be confined to the classroom with no possibility of external contact. Also, the lecturer was also confined to the classroom and could not find any external help without leaving the premisses. The lecturers had little technology available, and the most common help was transparencies.

Quite curiously and as a side note we must refer that in the 20th century personal computers were almost non-existent and typewriters were the main machine that could replace handwriting. In this context, the first personal computers (Armstrad etc) that were made were desktop computers and it was not possible to carry them into the classroom. Also, in the 20th century the internet was making its first steps, there was no electronic

social media – social media at the time was the individuals’ gossip circles, mouth to ear. Notes would be essential for students even if transparencies, exercises, summarised notes and textbooks were provided by the lecturers. The written notebook on paper was the main instrument of students.

3. Change began to increase in the early years of this century when mobile phones were invented. Suddenly it became possible for a student to be in the classroom and contact anybody outside by using an SMS; and also, it became possible for students to be in the classroom and send messages between themselves without the knowledge of the lecturer. The lecturer could also send and receive SMS messages while in the classroom, but this would most commonly not happen because of the distraction it may cause. For this reason, if a student would want to receive or to make a call, he / she would need to leave the room, the same for the lecturer. Anyway, the great and decisive novelty was that technology made it possible for people and mainly students to be in the classroom and maintain contact with the outside world – we would say the external isolation diminished - and it also made possible for them to contact between themselves while in class – we would say the internal isolation decreased also. We define external isolation as the possibility of being in a classroom and have contact with the outside world. We define internal isolation as the possibility of being in the classroom and contact other persons present in the classroom. Also, decisively in the first years of the 20th century, laptops came to exist, and although they were expensive and with limited capabilities – namely word processing – it became possible to take them to classes. Also, at the same time the internet began to exist, some platforms were created like Hotmail. In that time, PowerPoint slides become more and more widely used as a replacement to more traditional forms of lecturing – and this led to having less students taking notes and a decrease of the importance of written notebooks.
4. Finally, the tendency for a massive decrease both in external isolation and internal isolation was accentuated since 2010, with the development of smart phones, increasingly lighter and stronger laptops, increased access to the internet, new and bigger social media platforms like WhatsApp, and Artificial Intelligence tools like ChatGPT. In consequence, in current times, it is expected that in the classroom students will have their smartphone, as well as their laptop, and the same is true regarding the lecturer. Therefore, the probability of a student contacting members of their inner circle during a 60 to 90 minute lecture, is very large; students may also contact other students in the same class; students may access lecture related sites in the internet via smartphone or laptop computers; and students may contact sites with no relation to the lecture. The lecturer should not contact members of their inner circle during the class but may use the smartphone or the computer to search for some information that may be of relevance for the occasion. One of the ways the lecturer may use the improved technology is to ask the students to search for data using their own devices. This strategy effectively may give some rhythm and dynamic to the class, may have a positive effect on the group and also a positive effect on learning. Quite curiously, using that technique, the lecturer decreases the pressure of having to know all the data for a lecture beforehand, and by the same token increases the possibility of creativity. The creativity of the lecturer might pose a problem to the student because with all the technology available, laziness tends to increase, or at least there is more opportunity for it – i.e. if the lecturer writes something on the board that it is not in the PowerPoint slides, the student might take a photo using the smartphone. It is possible to be in the class listening to music due to improved headphones known as “ear buds”. Of all the possible behaviours, making and receiving phone calls remains the limit and the line that must not be crossed. Consequently, in the post- Covid-19 and artificial intelligence world, very few students still take handwritten notes, and some use word processors in their computers to take notes.

All that was previously said is summarized in the following Table 1:

Table 1: One century of classroom evolution in a nutshell

	Early 20th century	80s and 90s	Early 21st century	2010s Onwards
Internal Isolation	Complete	Complete	Decreasing	Almost non-non-existent
External isolation	Complete	Complete	Decreasing	Almost non-existent
Mobile phones	Non-Non-existent	Very few	Vulgar	Smartphones
Computers	Not in class	Desktops	Some laptops	Strong laptops

	Early 20th century	80s and 90s	Early 21st century	2010s Onwards
Internet	Non-Non-existent	Beginning	Increasing	Dominant
Social Media	Non-Non-existent	Beginning	Increasing	Dominant
Work in class by students	Notes	Less notes, transparencies	Even less notes. PowerPoints'	Almost no notes. Photos. Internet or intranet
Type of material available	Handbooks	Transparencies	PowerPoints	Internet Artificial Intelligence

Source: Own elaboration

Having said that, the question that remains is – what are we heading towards, and how will this new reality be framed in social and economic terms. We will address this situation according to three models – Technology People and Process, Brain Head Hand and also the concept of BYOD – bring your own device. We will also discuss the situation within the known theories about Knowledge Management.

To achieve the objectives of this paper, we will develop our thoughts in the following sections – 2 Concepts, 3. Theory, 4. Data from the SCOPUS database, 5. Discussion, and 6. Concluding Comments.

2. Concepts

To address the problem defined in the previous section we need to make some initial statements:

- 1. The main concept of this paper is the Classroom, defined as the place (Ba, in Nonakas terminology) in which learning and knowledge creation and acquisition takes place; in this space a group of Students and a Lecturer evolve (Nonaka, 1988).
- 2. We define External Isolation as the possibility of the classroom being more or less isolated from the outside world – the classroom may be totally isolated from the outside world as in a written exam and in this case the external isolation will be maximum, or the students may use the internet and the mobile devices, in this case, the external isolation is minimal. Currently the only limit to external isolation is receiving phone calls, and sometimes listening to music, but this situation is more difficult to address by the lecturer
- 3. We define Internal isolation as the possibility of being in contact with other members of the public present in the room. In a written exam that possibility is minimal and during a regular class it is very wide given the connections that students are using like smartphones.
- 4. Depending on the models, the classroom experience should increase the competences of students (HRD perspective) (McGuire, 2014), their Intellectual Capital (IC perspective) (Edvinsson and Malone, 1987) or their Knowledge (KM perspective) (Nonaka and Takeuchi, 1995). In fact, the three perspectives complement each other (Tomé and Gonzales-Loureiro, 2014). In this paper we will address the KM perspective.
- 5. In the classroom there will be technology, people and processes (Edwards, 2010) as defined in the model explained in the next section.
- 6. Regarding technology and because each student has many different possibilities for using it, we in fact live in a Bring Your Own Device world. Even if the State or the University may provide technology to the students there is always an individual element defining the technology each student uses in the classroom.
- 7. When we address technology, we may refer to computers, mobile phones, the internet connectivity and social media; all these four elements are very important in shaping what happens in the classroom nowadays.
- 8. The kind of lecture may also vary a lot: traditional lectures, discussions, role playing, exercises solving or presentations of work by students being some of the possibilities).
- 9. The kind of support provided by the lecturer may also be very different as: slides, summaries, books, cases, movies etc.
- 10. The work made by students while in the classroom may also vary a lot: they may take notes, solve problems, take photos, or just listen, to the professor or to music using headphones or they just be distracted and having their minds far away even if their bodies are present.

- 11. While taking notes, students use their Hands, which are related to the Brain and also to the Heart. This very basic triad that is used by palaeontologists and by neurologists to explain the development of mankind from the apes to the Homo Sapiens, quite crucially could have important consequences in the results of the activity in the classrooms.
- 12. All what was previously described only applies to University and Higher Education institutions and not to primary or secondary schools

3. Theories

According to the TTP model, institutions may be defined by the technology they use, which decisively is to be combined with the human capital to get a good performance. (Edwards, 2010). That performance can only be achieved through processes. Therefore, in any organization the first phase of knowledge management implementation is based on technology; afterwards, suddenly administrators understand that machines are not everything that is needed and that the people must upgrade their competencies and skills in order to make the best of the technology available. Quite surprisingly, this tends not to be the end of the story nor of the problems. In fact, even with the best technology at the hands of the most competent people, organizations struggle because they have to find the right processes, and that need may cause significant organizational change (Edwards, 2010). From here follow all the relevant analysis on technology and change (Evenson Westphal 1995); and on the maturity levels about using technology even digital maturity in this 4.0 industry (Gill VanBoskirk 2016).

The Triple H approach states that to achieve balance in life individuals need to put together three dimensions – the Head is linked with rationality, the Heart is a dimension with emotions, and the Hand is about actions (Kohle, 2023). This model is very close to a very well-known approach on knowledge management which states that in every situation there is rational knowledge (logic), emotional knowledge (emotions) and spiritual knowledge (values) (Bratianu, 2017). The decisive apportion of the Triple H model is the idea that actions matter and that without them no logic, emotions or values will materialize. This idea is very important in the context of higher education and particularly about what should be happening in the classrooms. Two other notes should be on the importance of the Hand:

Firstly, it is well known that the development of the human brain through millennia was closely related to the development of the use of the hands and the development of language. Therefore, the use of the hand is very important in education. Even further, in order to facilitate the memorization of matters and creativity, written notes are better than iPad or any kind of electronic summaries (Neupsky Key, 2023).

Secondly, following the work of neurologists, it is known that the brain and the heart are closely linked in the human species and the emotions and reason are associated. Therefore, we do not think first and feel secondly or vice versa, we think and feel at the same moment (Damasio, 1994). We believe and assume that also we might have values, at the same instant, and all this put together generates actions which in a class are basically developed using the hands. And when using hands the most basic and trivial and original ideas are made with pen paper and pencil only as stated above.

4. Data From the SCOPUS Database

We searched the SCOPUS database for papers on TPP model, 3H model and BYOD. The result of the search is shown below in succession:

4.1 The Model of Technology People and Processes

We only found six papers in SCOPUS using Technology, People and Processes as a framework and related to the Social Sciences or to the Business Management and Accounting fields. The most recent reference was dated from 2024 and generically related to data, AI and Trust for costumers (Kihn and Lin, 2024). One paper was about information literacy Del Massa, Damian, and Valentim, (2018) and the other about knowledge systems Sharma, Gupta, and Wickramasinghe (2005). The other papers addressed very specific economics fields; Civil Engineering (K. Witt, E. Lill, I. Banaitienė, N. Statulevičius, M, 2022) nuclear plants (Kovesdi, C.R. Le Blanc, K.2020) and property management by local authorities (Malaysia Razali, M.N. Ramlan, R. Manaf, Z, 2006).

Therefore, we reach the idea that, rather surprisingly, the TPP model has not been used to address the question of higher education in current times. This fact offers researchers a very nice opportunity.

4.2 The Model of Head, Heart and Hand

We found 19 papers in SCOPUS using this model and related to the Social Sciences or to the Business Management and Accounting fields. Szelwach, and Matthews, (2023) addressed the pos-Covid-19 reality and proposed “embodied organizational development” as a mixture of “*Thinking (Head), Feeling (Heart), Doing (Hands), and Being (Whole Body)*”. This idea is very close to the theoretical ideas we exposed in the previous section and is very relevant for whatever the future will be in Higher Education. In this context “embodied cognition” was put forward by Rittelmeyer (2022) as a new way of pedagogical success amplifying the 3 H model. Furthermore, Nonet, Dobрева and Meijs (2022) consider 3 H is fundamental in order to make business schools more in line with the 2030 Sustainable Development Goals and to move them from a students’ individualist perspective to a perspective with multiple contexts of wellbeing: individual, collective and planetary. Furthermore, the 3H model was studied on health professional students with high impact on self-reflexivity (Mills, Creedy, Sunderland, Carter, and Corporal, 2022); on international visiting scholars it was used to establish the importance of transformative learning and the process of learning (Zhao and Liu 2022) and it was also successful on the mentorship relation between instructors and students (McCullough and Pelcher, 2021). The model is seen as important to design the future of art schools away from scholastic universities to more ethical and creative institutions with the help of “humour” (Woods, 2021). This idea is very much linked with the KM theories on kinds of knowledge (Bratianu 2017). The model was also used as a measure of the possibilities of the improvement that robots and visual programming may make in STEM education (Blackley and Howell and 2019). Another experiment analysed the impact of the model in environmental and natural sciences learning (Jagannathan, Camasso, Delacalle 2018) in science knowledge and grades in mathematics, science and language arts. Also, and closely linked to the last paper we mentioned, the model was tested as a way to improve science teaching for engineers (Panthalookaran, 2017). The same positive effect was observed regarding the human rights law curriculum (Smith, 2013) environmental education using art (Deverman, 2005) and on theology studies (Masson, 1986). Finally, the model was also tested in primary schools (Liu, 2024) foster care (McDermid, Trivedi, Holmes, and Boddy, (2022) nurse mentoring (Jangland, Gunningberg, Nyholm, 2021) local citizens namely as teachers, experienced farmers or fishermen, unemployed youths with a certain educational background, and students (Eto, 2018).

Therefore, we found many insights on the use of the 3H model in higher education and many links to traditional KM theory (Bratianu, 2017).

4.3 The Concept of Bring Your Own Device

In the SCOPUS database we found 17 papers published since 2020 on the concept of BYOD in higher education and related to Social Sciences and Business, Management and Accounting. BYOD is seen as a feature of Industrial Revolution 4.0 (Vakeel, Kaushik, Dwivedi, 2023). BYOD can be seen as an important tool to foster learning and engagement (Demeke, 2023). However, some problems and complications exist with the solution: in one hand there are cybersecurity issues (Moloja, Ngqondi, Mpekoa, 2024) and technical issues (Masilo, Simelane-Mnisi, Mji, and Mokgobu 2021) and in the other hand affordability and compatibility (Fioravanti, Ozimek, Rodriguez, Crothers, Dielmann, 2024) the potential for inequalities (Clark, Welsh, Mauchline, Whalley, and Park, 2023) were also described as concerning situations. A solution for the implementation of BYOD would be discussions between and joint effort of students and managers (Santos, Bocheco, Vizzotto, Moro, 2021). Teachers should decide if they want to use BYOD in a traditional or in a constructivist way and adapt the classes accordingly. Within a social constructivism way of teaching student learning may be enhanced through the use of smartphones as a tool to promote collaborative learning (Lötter, Jacobs, 2020). Finally, the students' context, culture and main stakeholders' opinion should also be taken into consideration (Santos, Bocheco, 2020).

An evaluation on the effect of BYOD in the wellbeing of students gave mixed results pointing to the fact that the implementation was decisive (Al-Said, 2023). One study found that BYOD would increase motivation and autonomy of students (Sánchez, López-Belmonte, Moreno-Guerrero, Sola Reche, Cabrera. 2020).

Therefore, BYOD is seen as a very possible model for higher education nowadays, and the use of technology depends very much on the way it is done and on the posture of the lecturer. Social constructivism may be a decisive way of making students benefit from technology in the 21st century.

5. Discussion

If we put together the facts described in the Introduction with the concepts, theories and data enunciated after, we end up with the very interesting conclusion that the use of technology in the classrooms might be very useful, when it is compounded with 3H strategies and when Processes became more important than people or

technology. This idea put much responsibility on the lecturers but also on the students for the success of the institutions themselves. Given that BYOD seems to be a “fait accompli” because students are free to bring almost all technology to the class, and therefore the problem is how to benefit from this technology. In this context, the consideration of the three types of knowledge described by Bratianu 2017, coupled with the 3H model seem to be the best way to ensure the greatest application to the TPP model.

We only deal with University and higher education because it is the one we know better by our experience, but if we would have to extend the analysis to secondary or primary schools we would say that the problems are even greater at those levels because the students are less informed about on how to use technology correctly for their own benefit and therefore, the potential for damage that technology may have in their own upbringing and education is far greater than in higher education.

We do not deal with assessments, but we believe that Chat GPT makes one to one and written old school assignments necessary for undergraduates. Regarding Masters or PhDs, essays may be an option, but close monitoring is essential because the voice of the student must be apparent in the work. If we ask 10 students to describe the white wall that stands on the back of the classroom, they will write ten things differently and if we know them enough we will be able to assign each description to the right student. It is this type of social knowledge and complicity that we need to prevent that very soon Universities will become a chaotic and non-ethical space dominated by fraudulent use of technology. Because “bad money expels good money” in this case the future of universities will be doomed but we sincerely do not hope and believe this will happen because ethics will prevail.

6. Concluding Comments

There is no escaping to the fact that technology is here to stay and will inevitably increase in the near future in societies and in classrooms. In this context, Bring your own device seems to be a very important model. However, its success is only guaranteed in higher education if coupled with a sound and wise application of the TPP model and of the 3H model. This idea put much responsibility on the lecturers but also on the students for the success of the institutions themselves. These ideas have already been expressed sparsely and we put them together for this paper. A new equilibrium of cognition in learning will emerge that will most probably lead to a change in the organization of lectures and of the classroom. As a future study we propose a big mixed study to test our model empirically.

Ethics declaration: No ethical clearance was needed for the research referred to in this paper.

AI declaration: No AI tool was used in the development of the paper. We used conventional techniques like laptops, google search, all human based.

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