ISABEL HUET
TERESA PESSOA
FÁTIMA SOL MURTA

EXCELLENCE IN TEACHING AND LEARNING IN HIGHER EDUCATION

INSTITUTIONAL POLICIES, RESEARCH AND PRACTICES IN EUROPE

IMPRENSA DA UNIVERSIDADE DE COIMBRA
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The initial 'idea' for the book emerged during the seminar *Sharing of Innovative Pedagogical Practices* that occurred at the University of Coimbra (Portugal) in 2018. Like all 'good ideas', this one originated in a conversation between colleagues from the University of Coimbra and the University of West London in the United Kingdom. The 'idea' of this book was to move away from sharing experiences related to teaching and learning in higher education in just one or two countries, but instead to organise a more European view about the policy, research and teaching practices that are shaping the way our students learn, academics teach and do research. We have a total of 16 chapters from academics in Portugal, the United Kingdom, Ireland, Sweden, the Netherlands, Spain, Italy, and the Czech Republic.

The book is organised in four interrelated themes: (1) policy and quality; (2) professionalisation of teaching and academic development; (3) research and teaching nexus; and (4) pedagogy and practice.

Enjoy reading the book!

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DIOGO CASANOVA
Portuguese Open University and CIDTFF; Portugal
diogo.casanova@uab.pt
ORCID: https://orcid.org/0000-0002-8586-0370

From Humboldt to Netflix: examples of how to promote student agency in Higher Education

ABSTRACT: Student agency is becoming widely discussed in higher education, particularly in response to a sector that is increasingly becoming dominated by 'new managerialism' approaches influenced by massification, competition and marketisation. Reflecting on this existing context, this chapter aims to discuss the role of the student in higher education. The chapter starts with a brief contextualisation of *Humboldtian* ideals of higher education and how these connect with student agency. We reflect on how agency is being portrayed into the system as part of 'policy technology', which does not fully empower the students´ role. At this stage, the notion of ´power' balance is introduced which will add to the discussion of how this 'power' shapes the concept of lecturer and student agency at different stages of university practices.

We then discuss how student agency can be promoted in higher education by looking at learning environments, assessment, and the curriculum. We provide examples and case studies drawn from the literature. Within the curriculum we finalise by discussing a Netflix approach to higher education based on blockchain technology and personalisation of learning. This provocative scenario aims to foster readers to reflect on possible changes into higher education pillars, particularly those related to curriculum design and quality mechanisms.

The paper ends with a short reflection on how cultural aspects in different higher education institutions may shape the level of students' ownership and self-regulation of their learning process.

Keywords: Student Agency, Policy, Curriculum, Learning

1. Introduction

Higher education (HE) has been historically a sector where knowledge is shared among learners and academics. However, the involvement of students as active contributors to generating and producing knowledge

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has not been widespread. One of the most famous attempts to bring together students as active knowledge contributors in universities was developed by Wilhelm von Humboldt, a German philosopher (among other specialisms) who lived between the eighteenth and the nineteenth centuries. Humboldt concept of the university in Germany in the nineteenth century was a place where the student had the opportunity of engaging with an environment where research and teaching functioned symbiotically and where the student had the possibility of embracing the freedom of study which combined both of these areas of the academic life (Ash, 2006). Learning occurred in an environment where research and teaching took place side by side, and where students constructed knowledge in an inquiry and research-based environment (Huet, 2018). Humboldt believed in individual freedom arguing that students had as much right to decide about their subjects as professors had the right to choose what they were going to teach. Those views were significant at that time and were in contrast with a stricter curriculum in France (Ash, 2006). However, with the massification of HE, views of the student role in universities have been shifting towards other aspects of university life and less attention has been given to the student role in learning. In fact, with the increasing number of students in HE, particularly from the middle of the twentieth century, universities and teachers had more difficulty in adopting *Humboldtian* ideals of allowing students to collaborate more actively in their learning; as reminded by Nybom: "*European Ministers of Education and top-level bureaucrats seem to have moved in the opposite direction*" (2003, p. 16). Students became a number within a traditional paradigm of a lecturer-led transmission of knowledge. The pressure to move higher education to be made available to everyone, expanded the number of students enrolled in institutions. This boom in student numbers was not often matched with the correspondent number of teachers or teaching resources which put pressure on the management of universities, forcing them to adopt a more structured and efficient view of higher education.

Moreover, it is important to remember that the lecture theatre was designed based on the paradigm of transmission of knowledge from the

'Lector' (in Latin, the person that proclaims the scripture readings) to the monks who vigorously copied what they were listening, without any form of questioning or interaction. The word 'theatre' originates from the Greek 'the beholding area' where the audience would sit to view a spectacle (Beichner, 2014). Student agency was far from being the mainstream ideal of education in ancient history.

From the middle of the twentieth century new educational paradigms, centred in how students learn, started to be introduced in the higher education pedagogical lexicon. Constructivism and Social Constructivism, Active Learning, Collaborative Learning were all learning theories and educational approaches that explored the idea that students learn better when they have space to reflect on their learning experiences and discuss their learning with each other (Biggs & Tang, 2011; Bonwell & Eison, 1991; Kozulin, 2003). Furthermore, and in countries where students pay high fees to study, student voice has become more visible in decision making and influencing the management of universities (Warwick, 2016), more able to complain to the regulator, (Dandridge, 2019) and acting frequently as consumers, reinforcing instrumental attitudes to learning (MacLellan, 2001). We argue that this instrumental attitude to learning goes against the main principles of what higher education should be. We build from Humboldt´s view of higher education whilst we reflect on the values of agency and student ownership of their learning, to make decisions and have a voice about how, when and what they learn.

In this chapter we discuss how an effective strategic change in looking at student agency may result in a different higher education sector. We start by discussing the concept of agency and link it with the *Humboldtian* view of higher education. Then we move to reflect on how universities can implement spaces for students to express themselves and have more agency in their own learning and the curriculum design. We will make recommendations to how institutions should position themselves to improve students' own self-determination in their learning process based on a set of scenarios. We conclude by reflecting on how technology and societal habits may influence the future of higher education pedagogy.

2. Student agency and Higher Education: two worlds apart?

There is no broad consensus about the definition of student agency although most of the authors refer to ownership or sense of ownership of the learning process and the ability to make decisions – see for more detailed definitions in the work of Charteris and Smardon (2018) and Matusov et al. (2016). Agency is not a new concept; it has been widely discussed as part of a libertarian and neoliberal view of society where individuals are empowered to make choices about their own lives (Matusov et al., 2016). In education, it links to theories such as self-determination (Ryan & Deci, 2000), the development of a 'growth mindset' (Dweck, 2008) or self-regulation (Bandura, 2001; Martin, 2004), all of which were somehow discussed by Humboldt in his view of higher education (Ash, 2006; Nybom, 2003). Humboldt had a view of the students as actively engaged with learning, becoming agentic in their own curriculum, and learning path; in other words, students were perceived as equal agents in the university. As we discussed previously in this chapter, even if Humboldt´s ideal of higher education have been widely appreciated and defended, pressures from governments and top-level bureaucrats related to the massification of HE, the economic sustainability of the sector, and quality, regulation and accountability, have led the higher education sector to become more linear and restrict in how students learn the curriculum.

To frame the concept of agency in education we take account of the humanistic movement that frames the concept of power as a product of agency with which individuals are endowed naturally (Khatib et al., 2013). This power can be deployed or taken back (Charteris & Smardon, 2018). It is worthwhile reflecting on this notion of empowering students as this often fails to materialise the concept of agency into action since it becomes lost in a neo-liberal world of making others responsible for our actions. This adds to the dilemma of agency manipulation in the sphere of education (Matusov et al., 2016). Similarly, Czerniawski (2012) alludes to the danger of two competitive narratives in agency in education, one where we use agency to empower and to transform education and a second one where we use agency as a 'policy technology' (2012,

p. 131), as a way to feed into the narrative of increasing student voice without proper change. Building on data collected from interviews with lecturers and students, Czerniawski (2012) discusses that for student voice to become transformative, lecturers and policymakers in education need to move away from a 'synthetic trust' that is typically manifested in student voice initiatives. Similar findings are discussed by Freeman (2016) and Seale et al. (2015).

Student voice can be conceived as a 'forced-choice,' since students are positioned within a given discourse that makes the 'chosen' line of action the only possible action (Charteris & Smardon, 2018). For example, if we present to students Active Learning as the most effective way of higher education pedagogy and support our claim with research in the field, and then ask students "what is your favourite way of learning?" they will probably avoid saying "I want to participate in lectures because I like to listen to the lecturer delivering the content". In their mind, the 'right' answer would perhaps be "I prefer to learn with my colleagues by solving problems/questions".

Higher education has become inundated by this materialistic view of agency where students become actors with a script, but no effective ownership. This is self-evident when looking at structures in higher education management with typical student representation either at a course level (course representatives, course team meetings, student evaluation surveys) or at university level (university pedagogical structures or school level committees). However, one may ask "what is the impact of this representation? What actual change has been drawn by students´ representation in the curriculum or universities?". One can reflect on previous experiences while seating in course level or school/departmental level meetings and looking at the student role in those meetings. Firstly, students are frequently underrepresented in these committees/meetings; secondly, they must share their view with their own lecturers which pose a series of power balance challenges; thirdly, meetings are frequently organised based on hierarchy and traditional academic arrangements. In this vein, it is important to report on the findings from the study conducted by Lizzyo and Wilson (2009) who, after inquiring twenty students

about their own experiences in departmental meetings, found out that students reported on the complex motivations and conceptions about the role and were particularly concerned about the expectations that academic staff had about their role in such meetings. They concluded that the overall effectiveness of the role depended on the willingness of academics and management to engage in a constructive dialog with the students. Students did not feel safe to display their agency in such an academic environment. This goes profoundly against the *Humboldtian* model of higher education.

Agency is a dynamic process that is generated through a range of elements within education. It is co-produced by the individual when it relates to objects or other humans rather than possessing an "*ontological existence that is devoid of agency"* (Charteris & Smardon, 2018, p. 61). Students need to learn to become agentic in their own learning as much as factory workers need to learn to display their agency when invited to attend meetings with senior management or when making complex and unexpected decisions about their own work.

Charteris and Smardon (2018) argue that by making explicit opportunities to deploy student´s agency when we develop new generation learning environments, we "may strengthen and enhance students positioning in relation to their own learning" (Charteris & Smardon, 2018, p. 55). A similar approach to student agency is provided by Matusov et al. (2016) who discuss the existence of an emergent process that brings something new, innovative, and creative to the learning process; those changes in context may place different demands on students, which in turn develop different competencies.

Within the context of higher education where dispositions of agency rely on effective balance of power, it is important to reflect on the work by Foucault (2012), Gore (1995), and Nieminen and Hilppö (2020) who discuss the power relations between subjects and their positions within the discourse of agency. This is what Nieminen and Hilppö (2020) and Charteris and Smardon (2018) refer to as 'ecological agency'; how the individual interplays with learning environments and the opportunities for agency that these learning environments convey to the individual.

It highlights the importance of identifying affordances portrayed in the learning environment, and how those are tied to their broader social and institutional contexts (Charteris & Smardon, 2018; Nieminen & Hilppö, 2020). That is, we need to encourage a culture of agency that scaffolds, within the ecosystem of what universities are, how students may display their agency and, importantly, how other stakeholders let go of their existing power. An ecological conception of agency is situated in a specific context and it is dynamic. It may change over time depending on past achievements, understandings, and patterns of action between those that display agency and those that let go of their power (Biesta et al., 2015).

In the next section of the chapter, we will be looking at three areas where we believe agency can be actively deployed by students. We will be discussing these three areas based on existing research and looking at possible scenarios.

3. Agency and Learning Spaces

Charteris and Smardon (2018) discuss reimagining and recreating new spaces as a tool to promote innovation in what typically was seen by academics as hostile environments for innovation.

By reimagining spaces, universities may foster a new role for students in the learning environment, one that is more conducive to becoming more agentic in their learning. An example of this is a learning resource centre, which provides students with opportunities to learn and displaying agency in different ways: searching for books, navigating the Internet, collaborating with peers, studying alone, working on computers. Students have the opportunity to choose and mix according to their own interests. Conversely, a lecture environment typically conveys a message of instructor control. The position of the podium, often used in lecture theaters, symbolises an instruction-led learning environment (Casanova et al., 2018). Nevertheless, if this room does not have a podium and if everyone in the room has a similar power (i.e., don't have access to a projector, a whiteboard or with a layout where there is a focal point) the room is

portraying a message that everyone has the same degree of power. This is particularly important as it fosters a more balanced approach between the role of the student and the role of the lecturer. See for example the work from Casanova et al. (2020) or from Mey and May (2018) which propose the design of learning spaces that foster student agency.

Charteris and Smardon (2018), Casanova et al. (2018) and Boys (2011) are just a few of the authors suggesting that student agency is a crucial element when reimagining educational spaces with a promise of pedagogical flexibility and possibilities for shifts in teaching and teaching relations. In socio-spatial theory, space has the potential to shape practices and social interplay; it therefore influences the social politics of the relational environment (Charteris & Smardon, 2018; Massey, 2005). These arguments are supported by research that suggests that the design of a learning space influences on how its users conceptualise pedagogical practice (Casanova et al., 2018; Crook & Mitchell, 2012; Jamieson et al., 2000).

Reflecting on these theories, we believe that universities should change the way spaces are designed towards spaces that are more conducive to experimentation and where the role of the lecturer is not as explicit as it is in traditional rooms. One way of addressing this is by engaging students in the redesign of the learning environments. One practical example is provided by Lincoln University in the UK. The space planning team facilitated a workshop in 2013 involving fifteen students and lecturers and, through the use of design metaphors, the participants identified a set of factors that could inform the design of learning environments. The findings were clustered into two groups: (i) spatial factors, which were concerned with the physical environment in general, including the room layout and furniture; and (ii) social factors, which were concerned with the degree to which a room was facilitating participation, engagement and collaboration (Williams, 2014). The outcomes of the workshop informed the design of new learning environments at Lincoln University. Importantly, it provided a rationale for students engaging with the process of building their own space allowing them to enact agency that had a tangible impact on how the university was built. To ensure that

students and lecturers had a similar starting point and to create space for a balanced share of power, Williams (2014) suggested using design metaphors to involve all participants in the same framework of thought. A similar approach was developed by Casanova and Mitchell (2017) who conducted participatory design workshops with the objective of redesigning the learning environments of the future. In this specific case, the authors decided to divide students and lecturers as they felt that by mixing both groups, the lecturers' voices could suppress the students' voices during the discussions whilst making design decisions. Similarly, the authors also used design metaphors to ensure that all participants started with the same framework of reference. These authors concluded that involving students in designing learning environments had a significant impact on their own self-esteem and sense of belonging, as well as providing different solutions for space design.

4. Agency in Assessment

Assessment design in higher education rarely considers student agency. It is typically a lecturer-based exercise that allows little possibilities for students' agency and ownership of the assessment process; see for example the work from scholars such as Beaumont et al. (2011) or Nieminen and Tuohilampi (2020). Boud and Falchikov (2006) noted that, in assessment, students are mainly recipients of the actions of others. Charteris and Smardon (2018) claimed that the current assessment practices in higher education either neglect the notion of agency or even hinder students' agentic development. It is important to reflect on this psychological notion of agency in the assessment process, whereby the culture of higher education conceptualises a pre-existing role for the student and the lecturer.

Winstone et al. (2017), for example, conceptualised agency as a feature of the individual. However, one may ask whether conditions to enact agency in the assessment are being built in higher education. For example, what role does the student have if s/he only asked to engage

with feedback about the assessment at the end of a sequence of learning, without time or opportunity to use it to improve the assessment or related tasks (Molloy et al., 2019)?

The interplay of assessment and agency frequently neglects the socio-cultural aspects. In higher education, the role of the lecturer traditionally is to create/design the assessment, to grade and to provide feedback; whilst the role of the student is to submit the assessment and to wait for feedback and for the grade to be released. These 'power' relationships are discussed by Nieminen and Hilppö (2020) who drawn from the work of Foucault (1977) claimed that these 'power' relations produce in students and lecturers an implicit positioning, and that those are stable positions that control what can be done within the assessment process. That positioning is framed within the socio-culture environment of higher education (Arribas-Ayllon & Walkerdine, 2008). To change this approach, it is necessary to change the discourse; to reset the student position in the assessment process by enacting several elements in the assessment and reframing what we expect from students. Furthermore, Boud and Molloy (2013) argued that, beyond unidirectional actions between the lecturer and the student, lecturers have their own share of responsibility in designing better and more connected assessments which allow students to make use of the feedback received. Therefore, changes are both needed in the role performed, as well as the cultural shift of how assessment is designed in higher education. We provide below some examples of how the design of assessment may foster student's agency.

4.1. Co-creating assessments

Deeley and Bovill (2017) developed a study in a Scottish university aiming at involving students with the assessment from the outset. To engage students, they used them as partners in co-creating the assessment brief, the title and the criteria. They also implemented a peer-assessment strategy to allow students to obtain feedback from their peers. This study revealed how this approach improved assessment literacy and made stu-

dents more motivated and engaged with their assessment and feedback. In this model of assessment, the lecturer lets go of her/his creation role of the assessment, sharing it with the students who developed their own assessment artefact in an agentic manner. Other similar studies have been developed with similar results (Zhao & Zhao, 2020). This approach is perhaps the most radical approach to agency in assessment, but there are others more balanced as we explore below.

4.2. Self-assessing work

Using exemplars as assessment standards and linked them to self-assessment is a widely used approach to promote more agency in students' assessment. Typically, students' self-assessment is mainly used for developing assessment literacy and increasing awareness of the criteria. The use of exemplars to promote a better understanding of what is intended by the assessment is a widely discussed practice (Carless & Chan, 2017; Dixon et al., 2019; Jonsson, 2013). However, Nieminen and Tuohilampi (2020) have found that the higher the stake of the assessment moment is (summative rather than formative) the more authentic and agentic it is perceived by students.

4.3. Cycles of feedback

Feedback on student performance is viewed as one of the most influential and effective learning paradigms (Hattie & Timperley, 2007) and is widely appreciated by students as part of their learning experience. Winstone and Boud (2019) recommended that feedback should be delivered with a more dialogic focus on student engagement and increasing their responsibility in the process. Based on the concept of single-loop and double-loop learning, Carless (2019) introduced the concept of feedback spirals and loops. This concept represents how students learn when they work on assignments as part of their modules or programmes of study.

For the author, a loop implies an endpoint of the feedback; it can be at an assessment/module level (single-loop) or at a programme of study level (double-loop), which would represent a multitude of opportunities in different assessments; conversely a spiral would imply feedback that is more ongoing and developmental (Carless, 2019). Feedback spirals involve students making sense of inputs from a range of sources over a period of time in order to improve work and enhance learning strategies. In other words, it implies that students develop feedback literacy. In a similar vein, Boud and Molloy (2013) developed the concept of Feedback Mark 2 which happens when feedback is less controlled by the lecturer and encourages greater agency from the student in closing the feedback loop. In this concept of feedback, students are not just receiving inputs from their lecturers, but are actively involved in seeking information for improvement and are responsible for self-monitoring their progress. This approach to feedback generates an increase in student feedback literacy, but it simultaneously requires more effort and willingness from the students to change their role in the feedback process to a leading one. Both concepts allude to a more agentic role of students in the feedback process, one where they become agents in creating their own understanding and pathway for future development.

These three examples provide opportunities in assessment where students can develop their own agency in the assessment process. By incorporating these types of measures, we are not only providing a space for students to become more agentic in the assessment; we are also developing students' own assessment and feedback literacy. However, as noted by Boud and Molloy (2013) all of those require that lecturers design better and more connected assessment that encourage students to make their own connections with the feedback received.

5. Agency, curriculum and Netflix

As we discussed above, agency has been predominantly conceptualised as self-managed student ownership over the learning process (Ryan

& Deci, 2000). This traditional view of agency can only be upheld while reflecting on those *Humboldtian* ideals of promoting students' own free-will and how they learn in higher education. Nowadays, the curriculum has been designed as an inflexible and constrained framework dictated by quality procedures, institutional cultures, external bodies' requirements or sector level expectations (Barnett & Coate, 2004). The student role in this design process is, as we discussed previously, either part of a 'policy technology' exercise or provides some spaces for interaction that often fail to provide an ecological approach to agency (Carey, 2013).

Within the curriculum there seems to be an increasing demand for alternative and more personalised opportunities for learning. The concept of blockchain education, for example, maybe an interesting and innovative approach for promoting student agency in their learning. Blockchain technology is built on the principles of a decentralized environment where transactions and data are not under the control of any individual organisation. Rather than having one university certifying the degree, that process is made by a cluster of external entities, the blockchain. This approach poses challenges to quality assurance mechanisms, which typically fall short in going beyond the typical relationship between the higher education provider and the regulator.

If successful, this blockchain approach may result, in the future, in higher education degrees that are provided by a multitude of higher education providers, but the selection and organisation are made by the tutor and by the student in collaboration, whereas the certification is taken by the blockchain. For example, the student and the tutor would be able to discuss and set up the learning path based on a series of learning outcomes (LOs) and learning units (fig 1 – a). They could choose the institution(s) and the lecturer(s) responsible for delivering such a learning unit. The content could be either tailored to the student (based on a series of learning units aligned to specific LOs) or based on existing modules offered by the institution (fig 1 – b). Certification of LOs acquisition would be done by the blockchain through recognition of micro-credentials (fig 1 – c).

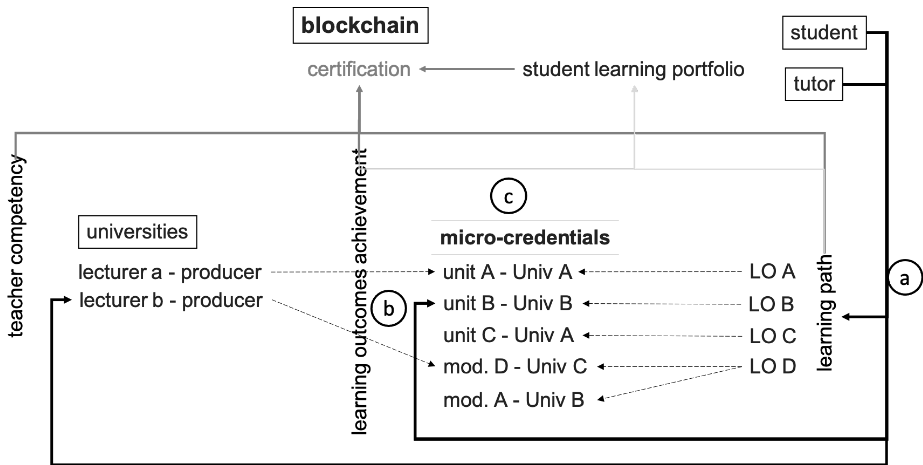

FIGURE 1 – example of a blockchain approach to higher education

For a better understanding of this approach, we use *Netflix*, the streaming platform as an example of a content-sharing platform (fig 2). *Netflix* is a web platform with video content that users can choose from, based on their level of interest or habits of consumption (McDonald & Smith-Rowsey, 2016). *Netflix* is both a publisher and a distributor of content. Let us imagine that rather than video content, *Netflix* was an aggregator of units of e-learning content (with videos, activities, and assessments) generated by different lecturers from different universities (using the Netflix analogy, the publishers). Each unit would be built to meet a specific LO. *Netflix* validators (which could work externally and affiliated to the blockchain) would be responsible for ensuring the quality of each unit and attributing micro-credentials to recognise student achievements (fig. 2 – a).

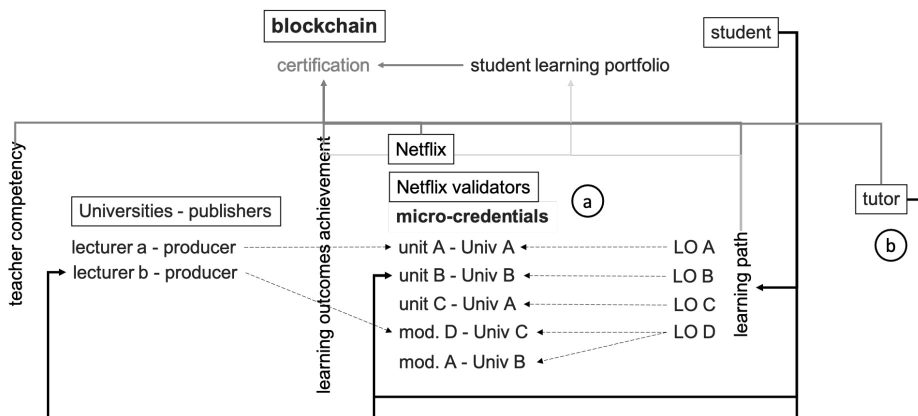

FIGURE 2 – Example of Netflix within a blockchain concept

Netflix, the aggregator of learning units, would be certificated by the blockchain. Learning units' quality and teachers' competency would also be certified by the blockchain. However, following this approach the student (with the help of a tutor) would be able to choose and mix which units and which lecturers they would want to use to achieve specific LOs.

Students would not be students of one university, but they would rather associate themselves with an individual tutor recognised by the blockchain (fig. 2 – b) and both would codesign a learning experience based on what LOs were to be achieved. Students would exercise their agency by creating their own learning path. The blockchain would both ensure the quality of the content and alignment with the LOs and the certification of the *Netflix validators*. Quality, procedures, and accountability would be the responsibility of the blockchain allowing higher education to concentrate on learning and research. *Netflix*, or any other type of content sharing platform, would be responsible for making learning units more available and providing further opportunities for students to choose from enhancing their experience and encouraging further agency in their learning.

6. Final considerations

This chapter discussed the concept of student agency in higher education. We started by discussing *Humboldtian* ideals of higher education and looking at how these were propitious for students to exercise their own agency in learning. We reflected on existing practices of higher education to conclude that nowadays the sector has been influenced by a 'new managerialism' agenda (Deem, 1998) and a uniform approach to management and to the curriculum, whereby students become a number, lost in a consumer-based industrialised environment with very little agency (see chapter 1 in this book). We argue that higher education often uses student agency as 'policy technology', as a way to feed into the narrative of increasing student voice without effective change. We provided three examples of possible mechanisms by which students may become more agentic in their own learning and learning experience. Learning spaces and assessment are two areas where students can actively contribute without profoundly changing the traditional pillars of higher education. We then moved to one provocative scenario of using Netflix and a blockchain model to re-engineer the foundations of the sector. Although provocative and unsustainable, this scenario may lead to reflecting on the impact that blockchain technologies, Netflix and social media are having in society and consequently on the future impact they may hold for HE, particularly in how they can contribute to increasing student ownership, self-regulation and self-determination of the learning process. This chapter aims at encouraging the reader to reflect on the concept of student agency in higher education. It is worthwhile reflecting on this by looking at the main *Humboldtian* ideals of higher education and whether they would be so much different if they were written in this century.

It is possible to argue that some of the areas discussed here are easier to implement in some cultures and some higher education sectors than in others. The experience of the author suggests that student agency may be different to enact in northern-European countries when compared with south or east European countries. Issues of academic

identity, professionalisation and privatisation of the higher education sector which are exercised in different ways and at different levels (Fanghanel, 2011), may all be contributing factors for student agency to be performed in different ways. Comparing higher education cultures and how those may affect student agency is an area underexplored and one that would share light on a stronger role for student agency in higher education.

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CARLOS LINDÍN SORIANO
Universitat de Barcelona, Spain
carles.lindin@ub.edu
ORCID: https://orcid.org/0000-0002-3640-1258

ANTONIO R. BARTOLOMÉ
Universitat de Barcelona, Spain
abartolomepina@gmail.com
ORCID: https://orcid.org/0000-0002-8096-8278

INDIVIDUAL LEARNING PATHS ON GLOBAL SHARED TEACHING: A MODEL/EXPERIENCE WITH BLOCKCHAIN-BASED CERTIFICATIONS

ABSTRACT: During the twenty century, several projects faced the challenge of adapting the curriculum to individual differences. Solutions based on digital reusable learning objects (LO) found difficulties because of the compromise between liability and flexibility in the distributed assessment. Blockchain offers safety and liability to certifications. This chapter describes a model of Adaptive Learning with the support of Blockchain, implemented at an experimental level at the University of Barcelona.

The students build their learning paths by engaging in the different LO and the assessment results are certified with Blockchain.

The development of this personalized learning path uses the Design Research model. During 2018-19 and 2019-2020, the design was applied in four groups at the University of Barcelona and it used the Ethereum platform for blockchain support. The adaptive distributed learning model was partially implemented with the collaboration of teachers from other institutions. The participants included 134 (2018-2019) and 132 (2019-2020) students.

It stands out the blockchain implementation design based on a two-steps process to avoid delays in the interaction with teachers. The students used the opportunities of the system to a reduced level of queries. Two useful developments were 'Edublocs Grade Book' (EGB) and 'Technology-Enhanced Assessment' (TEA), the first an online interface with Ethereum while the second a synchronized off-line software that facilitated the work of teachers.

Keywords: Adaptive learning, microlearning, learning objects, team teaching, blockchain

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