

Reconsidering Higher Education Organizations via ecosystem

Thinking: Some Initial Thoughts

Zito de Boer¹, Daniel Dominguez van Tilburg², Jan Kamburg³, Kyra Kronenberg⁴, Max Kuppens⁵, Emőke Takács⁶ and Toon Abcouwer⁷

^{1,2,3,4,5} Master students, ^{6,7} Academic staff, University of Amsterdam

zito.de.boer@student.uva.nl

daniel.dominguezvantilburg@student.uva.nl

jan.kamburg@student.uva.nl

kyra.kronenberg@student.uva.nl

max.kuppens@student.uva.nl

e.takacs@uva.nl

A.W.Abcouwer@uva.nl

Abstract: Providing optimal knowledge sharing has become increasingly important during the lockdown starting in early 2020. As a mechanism for sharing knowledge, education is also hugely impacted. Studying from home became feasible. On-campus learning had to change entirely to online within weeks. Besides preventing the spread of the virus, this shift allowed students to follow their courses anywhere. Physical distance to an institution is no longer a barrier to knowledge exchange. Online facilities offer students access to a broader field with an impact on the quality of education. The paper defines an ecosystem for higher education institutions (HEI) based on our own experiences with online learning, interviews, and literature reviews. The goal is to create a theorized environment where students can sign up for higher education (HE) classes, courses, programmes at different institutions across Europe. The ecosystem could create commonly shared quality standards from a decentralised perspective, potentially increasing learning quality and providing students with more freedom in their personal learning experiences. This paper does not serve as a full scientific proof but as a discussion. The proposed ecosystem foresees students to follow courses anywhere. It offers study-abroad programmes and inter-institutional collaborations with a centralised platform for knowledge management. Allowing students to choose classes institution-free would increase specialisation of those institutions and impact the quality of education. We will show that implementing a decentralised education system needs a bottom-up approach with a centrally formulated IT strategy to facilitate education exchange. Common quality standards, resilience, innovation, simplicity, inclusivity, maturity, and specificity are essential. For an adaptive system, governance, resistance, ownership, and communication ownership should adhere. Our proposed ecosystem of institution-free HE would benefit all parties involved. Students can tailor their learning experience and obtain the highest level of education possible. HEI benefit in improving the quality of their programmes due to added competition. They could also drop courses that students better take elsewhere, allowing for specialisation in specific fields. Such an ecosystem holds financial, administrative, and even legal limitations. However, institutions can implement step-by-step, giving affordance to the substantial bureaucracy that will inevitably ensue.

Keywords. Ecosystem thinking, higher education, decentralised education, digital collaboration, platform thinking

1. Introduction

Higher education Institutions, such as universities tend to be slower and more resistant to adopting change. The ongoing COVID-19 pandemic has shown how quickly and relatively seamlessly change can occur when the circumstances call for it. Institutions for which a fully on-campus learning environment was the only known method of operation, found themselves fully online within a matter of weeks, if not days. This rapid shift to online education allowed students to follow their courses in a manner that could help prevent the spread of the virus and follow their courses from anywhere in the world. It is this second aspect of online learning on which our proposed ecosystem is founded on, namely: an ecosystem of institution-free HE in the European Higher Education Area (EHEA).

Our proposed system sees EHEA students able to follow courses at anywhere within the ecosystem. Now, there are possibilities in EHEA to follow some courses at other institutions through study-abroad programmes, inter-institutional collaboration, and other similar directives. These possibilities are limited in their scope, typically to some pre-determined courses. The current system does allow students for a degree of freedom follow courses at another institution, but this is minute in comparison to the ecosystem outlined in this report. A fundamentally different concept, in which students would be able to tailor their learning experience through a centralized platform allow them to cherry pick courses from any EHEA institution. Because of online education, physical distance to an institution is no longer a barrier, giving students access to a higher level of education than possible

within the current system. It allows students to choose courses that certain institutions specialize, again resulting in a higher level of learning. Additionally, the increased competition for specific courses can increase the level of courses due to the added competition directly between courses, rather than at institutional level. In short, we hypothesize that such an ecosystem of institution-free HE can only increase the level of learning, as well as providing students with orders of magnitude more freedom in their personal learning experiences.

Currently, many students from universities can take classes from other educational institutions and have these count towards the completion of their current degree. The process of agreeing on this is not easy. The relevance of a new class to the degree needs to be checked and approved, requires a lot of administrative work and communication, in different languages between the institutions. To add to all this, most of the process is done manually by employees. This costs the institutions time and money that can be better spent on the education.

2. Related work

2.1 Decentralized education

To achieve the two goals of grounding design choices and forming the context for the functioning system we have chosen some themes: decentralized education, IT in universities and common quality standards in education. We further split the themes into segments to use in the ecosystem design. These three themes form a comprehensive base to understand the complexity of the proposed system.

2.1.1 Policy making

Policy making in education, the term decentralized is defined as any act in which a central institution formally cedes authority and power towards sub-national governance arrangements. Nudzor (2014), describes three types of decentralization to stimulate policy making:

1. *Administrative decentralization*: the relocation of branches from central to local
2. *Fiscal decentralization*: the transfer of financial power from central to local
3. *Political decentralization*: the transfer of power and resource to sub-national authorities

The article argues that although Ghana focuses on decentralized education systems, the traditional hierarchical top-down posture is difficult to transform. This causes educational decentralization structure that local governance operates in dual hierarchical and parallel structures. For this reason, to use a decentralized education system in Ghana, a bottom-up approach is recommended for policy making. Besides this, de-politicizing education policy needs to be put forth for using a decentralized education system regarding a policy making perspective. Although this paper is written based on the education system in Ghana, the authors strongly reverberate criticisms against centralized systems of educations and policy making in the sense that these systems do not support decentralization.

2.1.2 IT governance

Institutions such as universities are complex, and governance is shared broadly through different faculties, disciplines and administrative units. IT policies, development, implementations, and enforcement appear not to be straightforward, while that is crucial for IT governance (Krueger 2009).

The definition of IT governance is used in the paper of Krueger (2009) as 'specifying the decision rights and accountability framework to encourage desirable behaviour in using IT'. IT governance for a distributed IT unit should thus be built on a framework based on an overarching strategy. It aims to ensure the alignment of IT-related activities with a firm's strategy (Turel, Liu, and Bart, 2019). Although regarding IT services, we can make a reference to an institution from a central perspective. As a result, an unproductive and false dichotomy among IT operations may appear preventing a common strategy is more difficult to maintain an organization. Creating an overarching IT governance strategy from a decentralized perspective contains four main aspects:

1. Simplicity (a structure for decision making)
2. Inclusively (an effective advisory structure that ensures communication between groups),
3. Maturity (an appropriate performance-measurement process)
4. Specificity (an integrated approach)

A successful IT governance strategy is centrally formulated, based on the four aspects, but managed decentrally. The reason for an overarching IT governance strategy is to prevent specific units developing their own IT

strategies that do not fit within an institution (Krueger, 2009). The stakeholders can use multiple mechanisms, structures, processes and relational instruments for developing the organisation's IT backbone.

2.1.3 Enterprise architecture

Higher Education Institutions will change drastically in the next couple of years because of the accelerated hybrid education ecosystem in COVID-19 pandemic. Not all institutions are prepared yet for the disruption as current Enterprise Architectures (EA) are not resilient or suitable for the future ecosystem. Researchers speculate that Enterprise Architectures will be the determining factor in the 21st century, the factor that separates the winner from loser, the success and failure, the acquiring from acquired, the survivors from others (Zachman, 1996).

According to Gong and Janssen (2019), EA are key to ensure a successful transformation to the future hybrid education ecosystem. This is important as a different form of EA and governance is needed for facilitating adaptable learning. Moreover, multiple challenges can arise when transforming EA in the education domain, management support and prior knowledge needed to support HEI with right IT tooling to become more resilient. Nevertheless, it is not realistic to expect that EA can deal with all enterprise aspects. It also does not reduce an organisations complexity and it is certainly not a one-time effort.

2.1.4 Collaboration of universities

The book *Mergers in Higher Education: Practices and Policies* contains a section in which Boer (2019) gives an overview on Dutch HE collaborations with varying degrees of success, and defines the different inter-organisational formations, which vary based on the level of integration between organisations. The first collaboration mode is cooperation, where fully independent organisations share information to support each other's organisational outcomes. Coordination is where independent organisations align activities and services that support mutually beneficial goals. Collaboration is when organisations give up some independence to realise a shared goal. These forms of integration are extended upon with acquisitions and mergers, in which organisations give up their autonomy to become a part of one of the existing ones or form a new organisation.

An excerpt from a journal by the same author, Boer (2019), looks at the possibilities of online learning, and the collaborations which were possible in the pre-COVID era. The article assumes the author's inclination toward online education, outlining the benefits while highlighting the barriers. Naturally the pandemic has expedited the goal which the Dutch ministry set to have all educational materials available online by 2025 but worries remain. Institutions that were pioneering online learning in the Netherlands in 2017 felt insecure about the possibilities and limitations regarding collaboration, which are still valid concerns. Laws as the 'One-third rule', state that a student must obtain only one-third of credits from an institution other than which is providing the degree place harsh restrictions on what would otherwise be seamless collaboration.

2.2 IT in universities

The organizations within the educational ecosystem process inputs and produce outputs related to the environment that the organization performs. Educational technology of partners is important in transferring knowledge and to use those tools as mediating technologies.

2.2.1 Resilience of universities

The role of information technology during the past decade has changed a lot as the educational ecosystem has had to adapt to its surroundings and circumstances. The technologies started off as an optional tool that could help actors if implemented according to their needs (Jackson et al., 2011). This changed drastically and the technologies became a necessity in the ecosystem rather than a choice or optional artifact (Ali, 2020). The necessity of technology also meant that technology tools had to be implemented regardless of the benefits or disadvantages. The resilience of institutions was tested, specifically social resilience, as they had to adapt to the sudden changes within the ecosystem.

2.2.2 Zero trust environments

Among others, building trust between ecosystem participants is one of the major challenges a data ecosystem has to overcome (Gelhaar and Otto, 2020). In highly digitized organisations, this can be manifested as the fear of revealing valuable or sensitive data. A potential solution to this challenge might involve crafting up legally binding contracts ensuring suitable collaboration from both parties. However, conventional contracts are complicated to set up, disconnected from ICT-systems and when conflicts occur, tracking their execution is restrictively slow (Norta et al., n.d.).

Overcoming such barriers is possible by using a combination of Block Chain Technology (BTC) and Multiple Agent Systems (MAS). This would enable contracts to be directly implemented into organisations' ICT-systems, resulting in automated and decentralized tracking of individual actors' actions conformity to said contract. Furthermore, implementation of smart contracts onto the blockchain can add automated execution of specific consequences when a contract is breached into the system. Ecosystems demanding high reliability, privacy preserving, immutable data repositories and smart contract execution have the potential to benefit from BCT implemented MAS (Calvaresi et al., 2019). The contracts that are used need to be machine readable. Added complexity of these systems and a different way of thinking about trust impede smooth implementation. Other barriers include the design of intuitive GUI's for facilitation of usage by laymen.

2.2.3 Student Pain Points in current systems

Understanding students need in HE IT system, one needs to look at their current pain points and wishes. A study at the University of Münster, discovers German students' issues with the universities IT system (Thoring, Rudolph, and Vogl, 2014). The most important thing students want was a centralized system instead of multiple small unconnected ones. The ease of use was valued as very important. Students found that commercial applications such as Microsoft Office and Dropbox are much better suited for their needs than home-brewed solutions by the university. A lot of universities have these home-brewed systems, but since they are not receiving as much attention as commercial products, they are behind the current standards by usually a few years, both in UI design and functionality. Overall, the situation can be concluded with a quote from the study: "From the students' point of view, IT should enable them to focus on the content of their studies, provide support for organizational problems, and grant easy access to resources, such as literature and software, while at the same time require little effort."

2.3 Common quality standards in education

Looking at the quality standards in HE ecosystem, first, we check universities accessibility and then we give insights in the accreditation system.

2.3.1 Accessibility of universities

The process of applying for courses in different HE institutions can be quite difficult and lengthy. Focusing on the application process that one can face when want to follow a course in a different institution, we looked at two universities: University of Amsterdam (UvA) and University of Waterloo (UW). Although the universities were selected randomly, they reflect the general application process in Europe. UvA follows the guidelines of 'Global-Exchange' programme. Before the application process one is asked to make a list of the desired courses, then it is checked if the entry and language requirements and the specific criteria per faculty or academic department are met. The guidelines determining relevant academic background of a student are in the 'Courses and Faculty Criteria' document. At UW before one can take a course at another university, must fill in Permission Request Form before enrolment otherwise it will not count towards the degree. There are strict rules for a core course. In conclusion, universities generally are not accessible to outside students easily. It requires paperwork approved by people, making it time-consuming and susceptible to bias.

2.3.2 Accreditation system

Accreditation is described as a procedure to provide legitimacy both inside and outside HE and has become an increasingly popular method for quality assurance. In Europe, accreditation systems are prevalent in almost every nation as a means for assuring the HE standards. Some key points often stated in favour of accreditation is that it is suitable for situations which require a minimum degree of quality, a degree of uniformity between study programmes, and in which increased student mobility is desirable. Some criticism levelled at it is that it narrows the focus on minimal standards rather than the challenge of quality improvement, does not add any value, and pays no mind to the educational context.

A key policy process associated with the spread of accreditation that has significance to the desired outcome of our ecosystem is accreditation's role as a networked governance. This role is seen as a consequence of governance agreements transcending the national level, such as EU wide directives. One such directive (Lex, 2006) allows educational institutions to adopt any accreditation agency within the EU Register. This piece of legislation is pivotal for our ecosystem, as the ability of any institution to adopt the accreditation agency of their choice opens the possibility of an EHEA wide standard (Stensaker, 2011).

3. Ecosystem design

Ecosystem design and ecosystem goal with the main research question in mind: How can an ecosystem be created where students are able to follow higher education at different institutions in Europe by creating a common shared quality standard, from a decentralized perspective? is next to discuss.

Currently, students can take classes from other HEI and have them count towards the completion of their current degree. The approval process is not simple. The check and approval require a lot of administration and communication along the institutions' different channels, sometimes in different languages. Most of the processes are manually done by employees. This costs the institutions time and money that can be better spent on the education and the institution itself.

The goal of this ecosystem is to create an environment where students can sign up to HE classes, courses, programmes at different institutions across Europe by creating common shared quality standards. This is done from a decentralized perspective that increases the learning level and provides students with more freedom and opportunities in their personal learning experiences.

We divided the ecosystem design chapter to several topics to highlight how the ecosystem should look, who are involved, what their roles are and how to make the system future-proof.

3.1 Partners of the ecosystem

There are many different actors involved when implementing international education quality standards across Europe. All have different purposes, different roles, connections, and mechanisms that are important to comply with. The collaborating partners are internal, external, and international.

Partners of UvA are interconnected and share common interest to create knowledge, communicate, and co-create within the organization. They focus on certainty, uncertainty, and risk that represents the status of activities and reflects the probable future.

Internally, there are many actors playing a role surrounding international education and establishing quality standards. They are a part of the policy and governance, the faculty, and the education branch. Specifically, the following departments are directly involved within the proposed ecosystem:

- Academic affairs (Policy and Governance) is responsible for formulating the strategic education and research policies. This includes the international aspect of strategy.
- Board of the University (Policy and Governance) is the central board of the university.
- Deans (Faculty) important link between student and university excluding the content of education.
- Education committees (Education) is a collaboration of students and professors where the quality and organisation of the concerning educational program are discussed.

The institutional plan 2021-2026 represents the goals and values the UvA wants to adhere to. Within this plan, there are ambitions of UvA to cooperate with partners, suppliers, and universities (UvA, 2021). The university aims to broaden the accessibility of the university as a partner, specifically for external partners on local, national, and international level.

Collaboration with external partners positively influences the university as, according to the Plan it stimulates research, gains insights from practice and experts and helps to spread and use the knowledge that is generated from these partners. Specifically, UvA works together with international universities in the League of European Research Universities (LERU) and Erasmus+ programme. Also, the Dutch ministry of education is involved as regulator of the education standards and interact with other countries in the international education system.

Other external (international) partners are involved as well:

- European Higher Education Area (EHEA) is a collaboration of 49 countries with a common set of commitments: adopt key values such as freedom of expression, autonomy of institutions, academic freedom and free movement of students and staff with the goal to make HE systems more compatible and strengthen quality assurance mechanisms.
- European University Alliance (EPICUR) is an initiative to strengthen strategic partnerships encouraging bottom-up networks of universities across EU. It allows students to obtain degrees by combining studies in different EU countries.

UvA claims that they can take advantage of the location of the university and good research and educational practices to enhance the partnerships and collaboration between involved parties. This is possible by investing into external relationships and the role in the European education and research system. This proposal therefore aligns with the wishes of UvA and the partners.

3.2 The role of managers and teams

After ecosystem partners, we determine the internal role of managers and teams and the external role of managers to create common quality standards for education across Europe.

Looking at the 2021-2026 UvA Plan, a leader is someone with an entrepreneurial mindset, an eye for diversity and working together with teams. They are expected to understand the relevance of effective workflow organization and transparent decision-making together with other employees. Employees should develop leadership skills to support management duties. It highlights the difficulty making a management position attractive (*ibid.*).

Diving deeper into how UvA sees the role of managers, inclusivity and diversity play a more important role in how management is organized. The university from an organizational perspective strives to be agile with teams that ensure creativity, creating standards for business processes and shrinking the distance between the scientists and managers. Another key finding, which is relevant to outline for the proposed ecosystem design is about internationalization and the ability to study abroad. From a managerial perspective, a collaborative approach with the EPICUR and EHEA is extremely important. Also, the focus on diversity and inclusivity as collaborating internationally comes along with cultural differences, races, etc.

Linking these findings back to our related work, we recommend a bottom-up approach for the ecosystem. It strives to create a decentralized educational system that enables following courses at every institution due to common quality standards. From an internal perspective, the role of managers with the current standards of UvA are clear and able to succeed in the proposed ecosystem. From an external perspective, the management role is more important for different aspects.

Creating an overarching strategy and common governance so that participating universities know responsibilities, goals, and roles in governance the ecosystem can succeed. An externally responsible manager is advised to design clear objectives and time periods. Also, teams should be formed with responsibilities for certain objects. Making diverse teams to learn from each other and from different inputs. Teams should feel responsibility, set deadlines, and divide the roles. The manager role must be accessible and open-minded.

3.3 The role of I(T)

To support all the functionality of the ecosystem, an IT system is used to make easy interaction and work for all the stakeholders. The background research for this ecosystem design showed one of the biggest problems mentioned by students: the number of different systems used every day (Thoring, Rudolph, and Vogl, 2014). We envision the creation of a shared platform, that will act as a bridge between all involved parties.

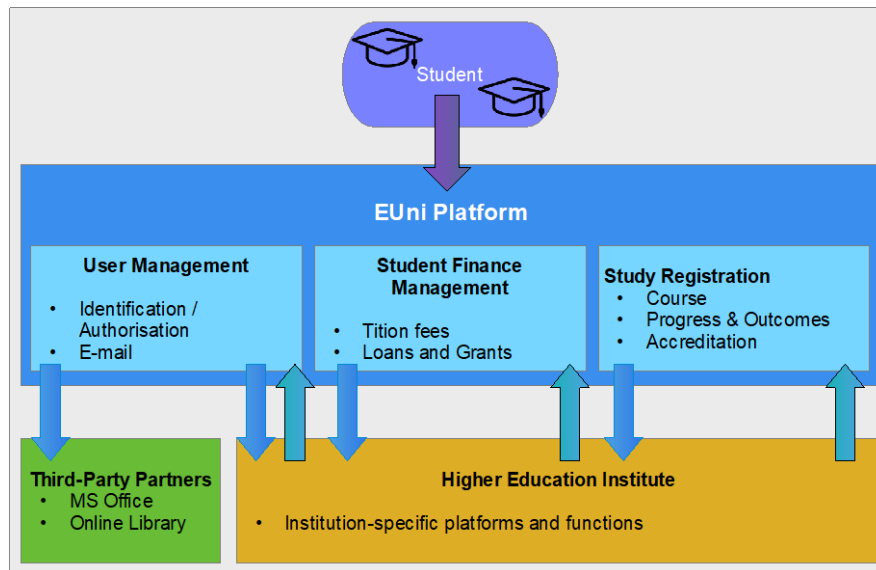


Figure 1: EUni Platform high level design

The platform enables students to do course registration and HE learning by providing interaction points:

1. **Student** registers with **EUni Platform**
2. **Student** applies at primary **HEI** for programme
 - **HEI** checks students' prerequisites and admits student
 - **HEI** provides tuition fees to **EUni Platform**
 - **Student** pays fees centrally using **EUni Platform**
 - **Student** can now make use of **Third-Party Partner** applications and resources
3. **Student** signs up for courses at primary or other **HEI** using **EUni Platform** depending on preference
 - **HEI** allows students to access their course using their **EUni Platform** user account
 - **HEI** reports results for courses to **EUni Platform**
4. Primary **HEI** issues graduation certificate to **Student** once credits, programme requirements fulfilled
 - **Student** can access certificate via **EUni Platform**

This description shows the platforms functioning from students' perspective to help them with their studies and the enrolment to courses to complete within the new ecosystem.

3.4 Resilience and Adaptivity

Resilient and adaptive ecosystem design is key for implementing international education quality standards across Europe. Possible resistance may arise, and HEI must handle unforeseen circumstances.

3.4.1 Resilience

A resilient ecosystem can bounce back from difficult events. It has capacity to respond to disturbances by resisting damage and recovering quickly. Resilient organisations are better in dealing with complex adaptive systems settings. Especially when implementing international education quality standards across Europe, resilience is crucial. Creative academic programming is becoming more and more important. Research shows that graduates will change their profession multiple times before they retire. A trend in increasing joint degree programs is identified and a demand to further encourage collaboration between faculties and universities (Michael and Balraj, 2003).

It consumes time to change to designed processes within an ecosystem. Innovation happens in three main forms: Reactive, Proactive and by Anticipatory innovators. The last shape is the most suitable for the introduced ecosystem since it causes the emerge of resilient organisations, which ensures innovation within the organization culture (Teixeira and Werther, 2013).

Although resilience is one of the key design principles of the envisioned ecosystem, resistance may happen:

- The prestige of universities: Universities who fear for their spot in the QS World University Rankings®

- Value of a diploma/certificate: not guaranteed European institution prestige can lead to worthless certificates
- Quality guarantee of education: When courses can be attended at multiple faculties/universities it will be harder to guarantee the uniformity of the provided education.

3.4.2 Adaptivity

Organizational adaptability shows how quickly organizations adjust their business processes and improvise themselves to achieve goals. They must prepare for future challenges. Several ones need to be considered in our proposed ecosystem. To make the system successful and adaptive, the following four things must be considered.

Institutional Governance: Most institutions within the educational ecosystem are autonomous and stand-alone. Each institution has its own governance structure with its set of rules and policy processes. One such policy process, for example, is the approval process, to which different institutions have different special rules.

Faculty resistance: To make it accessible for a student to take courses at different universities a major characteristic is faculty cooperation. If faculties cooperate poorly with the initiative despite it being initiated by the university council, it will have a major impact on the success of the programme. From a traditional point of view, faculty members themselves work focused on their own research agenda and interests. This new programme will require faculty members to work together to form a shared curriculum and interact with members from the other institutes. Since this requires new ways of thinking and somewhat changed beliefs, it may be an uncomfortable process.

Institutional ownership: Institutions claim ownership of every degree they expend. A question arises as to who owns a joint degree. For the purpose of access to resources, this will need to be looked at carefully.

Communication ownership: Availability of the necessary infrastructure that allows communication between two faculties is crucial. When faculty members or students experience difficulties in connecting to the other institution, the programme will suffer from unreliable support.

4. Discussion

Naturally, a system as ambitious as this does not come without several limitations. Some fundamental matters of he may have to be uprooted and built from the ground up, or at the very least, restructured. It is important to note that some of these limitations do not fall within the scope of the proposal, but their relevance is such that it would be amiss not to mention them. These limitations are not limitations in that they are unsolvable, or even difficult to solve, however the issue arises in finding a solution that the majority of institutions agree with.

4.1 Financial

Perhaps the first limitation that springs to mind in this context is a financial one. This limitation has many facets, however the two most relevant ones from a student perspective are those of tuition and financial aid. Tuition rates within the EHEA can differ significantly from nation-to-nation European students in Austria receive their education for free, while those in England can expect to pay well over €10,000 per annum. This would need to be addressed, and some sort of standardized tuition fee would be the logical solution, as a student who is registered to study in England and takes half of their credits in Austria should not pay any more than a student registered in Austria taking half of their credits in England in the ecosystem. If tuition fees remain at the discretion of the institutions/national governments, then there would be numerous scenarios of students paying differing amounts to receive the same education. Just as there now exists in many European country's tuition fees set at a national level for public institutions, so would there be a need for tuition fees set at an EHEA level.

The other relevant financial matter from a student perspective is the allocation of financial aid. Financial aid is administered at the national level, with many nations having incentives for students to remain studying within their home nations, by offering less - or even no - financial aid when studying abroad. This is another topic that would need addressing, as the ecosystem allows for the possibility of a student being registered at an institution abroad while taking a majority of courses within the home nation. At first glance, however, this appears to be a more minor issue in comparison to tuition given that students would have the option to register at an institution in their home country.

4.2 Admissions

Admission conditions to various institutions in various countries is an issue that would rapidly need to be addressed and ideally standardized. The Netherlands provides a good example. Secondary school in the Netherlands is separated into three different levels (VMBO, HAVO, and VWO), with only students at the VWO (university preparation) level being allowed to directly transition into a Dutch university. These separations and pathways do not exist in all European countries, providing the possibility that a student who is not eligible to apply for university in Netherlands after completing HAVO (general secondary school) level may be accepted at another university in Europe. Within the ecosystem, this would then allow them to take courses at the very universities in the Netherlands for which they are technically not qualified to attend. Differences in the acceptance of students into programmes would have to be considered in a larger scale, and preferably result in a form of standardized admissions policy.

4.3 Rules and Regulations

To make this ecosystem function in the intended manner, rules and regulations must change. In the Netherlands regulations stipulate that student receiving a diploma from an institution must have completed at least two-thirds of their credits at said institution. While this is becoming generous allowance, similar regulations exist in nations throughout EHEA to differing degrees, and ultimately creates a barrier to the freedom intended by the proposed ecosystem. Ideally, no such restriction would exist, and students could choose their courses freely, however an EHEA-wide rate would also help the system thrive. We expected that institutions and legislators push this percentage to be higher, while students for a lower one. It is hard to estimate what figure would ultimately represent a happy medium, however the lenient nature of the Dutch rule gives hope for an even more generous allocation.

5. Conclusion

Answering the question on How can an ecosystem be created where students are able to follow higher education at different institutions in Europe by creating a common shared quality standard, from a decentralized perspective? we highlighted the importance of providing the optimal form of teaching, analysing the education ecosystem upon partners, roles of managers and teams, IT, resilience and adaptivity.

We defined an optimal HEI ecosystem for the future based on interviews and literature reviews. If a decentralized education system will be implemented a bottom-up approach is recommended for policy making (Nudzor, 2014). We recommended a centrally formulated IT Governance strategy based on four aspects (simplicity, inclusively, maturity and specificity) and managed de-centrally.

EA are not future fit, resilient, or suitable for the future ecosystem. Multiple challenges can arise when transforming EA in the education domain and management support and prior knowledge is needed to support HEI with the right IT tooling to become more resilient (Gong and Janssen, 2019)

Common quality standards in educations can be a solution, making universities more accessible that leads to a simplified (uniform) accreditation system.

Collaboration with external partners positively influence the university, stimulates research, gains insides from practice and experts and helps to spread and use the knowledge that is generated from these partners.

The role of managers is key to make an ecosystem succeed, by creating an overarching strategy and common governance so that every participating university knows the responsibilities, goals, and their role within the governance. The role of a manager must be accessible and openminded.

Examining the role of IT in the new ecosystem, it plays a central part in connecting all partners of the ecosystem. Data transfer via an IT system would greatly streamline the process of enrolment of students cutting down on administrative overhead. Connecting different institutions' IT systems and partners is a challenge and a long process. The advantages it would bring in terms of efficiency and ease of use for all parties involved would make it a worthwhile endeavour.

To make sure an organisation is resilient and able to bounce back from difficult unforeseen circumstances, anticipatory innovators should be introduced. This group will make guarantee innovation within the organization

culture. To create an adaptive system the principles of institutional governance, faculty resistance, institutional ownership and communication ownership should be adhered.

We proposed an ecosystem of institution-free HE within the EHEA, which brings benefits to all involved parties. Students would have the ability to tailor their learning experience and the opportunity to obtain the highest education level possible. HEI would see benefits in both improving the quality of their programmes due to added competition, as well as dropping courses that are better taken elsewhere, allowing for specialization in certain fields. Of course, such an ecosystem brings with it limitations, otherwise it would likely have already been limited. Financial, administrative, and even legal (to some extent) barriers stand in the way of a full implementation of the proposed system. By its very nature the ecosystem could be implemented on a step-by-step basis, giving affordance to the substantial bureaucracy that will inevitably ensue.

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