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How is Digitalisation Affecting the Flexibility and Openness of Higher Education Provision? Results of a Global Survey Using a New Conceptual Model

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The adoption of open, online, flexible and technology-enhanced modes of learning (in short: of OOFAT) differs by higher education institution, despite the general cries of revolution and disruption due to digitalisation. This paper presents a new conceptual model for framing difference in three key educational processes (content, delivery and recognition) related to the potential of digitalisation to make these processes more flexible and more open. It is based on the results of a global survey of 69 higher education providers. The findings reveal six distinct archetypes of technology-enhanced higher education which vary according to the extent to which digitalisation is harnessed for content, delivery and recognition, and suggest different institutional strategies of digital adoption. It is hoped that this contribution will support comparative analysis of digitalisation strategies and peer learning between institutions.

Keywords: Open education; Technology enhanced learning; MOOCs; OER; e-learning; higher education; flexible learning

1. Introduction

The tertiary education ecosystem is, like nearly every sector, undergoing a period of change influenced by digital, networked technologies, as well as broader social and economic shifts. As a consequence, higher education institutions (HEIs) seek to harness new technologies to better serve current students and also to reach new student populations. Over the past twenty years participation in higher education has been expanding rapidly across the globe (Dohmen 2018), but also the expectations to widen participation in higher education have increased. Fifty years ago such considerations led to the establishment of specific national institutions in many countries (e.g. The Open University, UK), but the expectation is now for all, or at least most, higher education providers to contribute to widening participation. In the context of this expansion and efforts to widen participation, it is vital that people in medium-low and low-income countries are not left behind both in the debate on developments and in their opportunities to participate (Salmi 2017). A key reference goal, for instance, is the Sustainable Development Goal 4.3, which states: “By 2030 ensure equal access for all women and men to affordable quality technical, vocational and tertiary education, including university” (United Nations 2015).

This is a challenging time for the organisational design of universities and colleges. New technologies are facilitating a higher education, which leverages networked and information technology to provide more flexible and more responsive education without the need for the expensive infrastructure of a traditional open university (Daniel 2017). In this, there is considerable rhetoric around disruption in discussions on the impact of ‘game-changing’ technological change to society and business (Brynjolfsson and McAfee 2014; McAfee and Brynjolfsson 2017), but also to higher education itself (Barber *et al.* 2013). For instance, Christensen took his analysis of the problem of established institutions adopting innovation and applied it to higher education. He suggested that new entrants to the market could serve learners better through less “fussiness” about formal educational prerequisites and more agility (Christensen 1997; Christensen and Eyring 2011). This leads to a dominance of what can be termed a “Silicon Valley narrative” which highlights the potential of technology to revolutionise sectors, without analysis of the actual usage and impact (Weller, 2015).

Such a perspective on technology usage in higher education fails to analyse the ways in which it is currently deployed in a wide variety of global contexts. It also treats universities solely as content providers, whereas they are a more complex type of institution that provides a collection of interrelated services and functions. Moreover, this ‘disruption’ model of technology adoption in higher education, as for example evidenced in the rhetoric accompanying MOOCs, tends to propose one universal solution

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and application of technology, whereas the reality is likely to be nuanced and involve a variety of models. In the field of higher education research, HEIs are often referred to as hybrid institutions, which are influenced by their external environment, but also isolated from their environment through layers of institutional autonomy (Jongbloed 2015). While they could be described in the past as ‘loosely coupled expert systems’ (Kogan and Becher 1980; Weick 1976), changes to their governance (including autonomy and funding), their place in society, and the need for HEIs to remain financially sustainable means they are moving away from this model. They require organisational strategies, which balance traditional legacy in some parts of the organisation with innovation and extension in others.

This paper explores institutional strategies for leveraging the potentials of digital technology. The problem the paper seeks to address is how to represent the implementation of digital technology in such a way that it captures the wide range of practice globally.

This paper presents research undertaken for the International Council for Open and Distance Education (ICDE), a membership organisation in the field of open and distance education, and supported by a global advisory group. The aim of the research was to uncover key models being used by HEIs when they adopt new technologies, and specifically the role of open, online, flexible and technology-enhanced (OOFAT) modes of operation. The exploratory approach used sought to provide insights into the pattern of implementation in key teaching and learning processes by higher education institutions from across the globe.

2. Conceptual Model

In order to structure the study, it was necessary first to produce a conceptual model of open, online, flexible and technology-enhanced (OOFAT) that could be used to capture the practices of higher education providers. The model needed to provide sufficient structure to enable a synthesis aggregate of OOFAT implementation, while being broad enough to capture all possible use cases. To address this aim, the conceptual model started out from central processes in the higher education enterprise itself.

These are the so-called “bundles”, which make up the higher education provision package. Agarwal (2016) classifies these as: clocks, content and credentials. In other words, provision is made up of how higher education is delivered (“clocks”), what is delivered (“content”) and how achievement is made recognisable to third parties (“credentials”). In an alternative scheme, Mackintosh (2016) identifies six services which make up the university package. Following content services, he refers to teaching and learning as “interaction services” after Moore (1993), and identifies assessment and support services as additional distinct activities, which lead to credentialing services, and these are all supported by technical instruments, which ensure an effective learning environment (Miao *et al.* 2016). The first scheme can be seen as subsuming these six elements but is formulated on a higher aggregate level, since “clocks” is actually about place, pace and timing, as well as the form of delivery (online versus physical) and,

if we follow Moore, “content” addresses the interaction between teachers, learners and content, including learning analytics.

With a slight reformulation for clarity and conciseness, the basic conceptual model used in this research was based on the following three central processes:

- **Content** – consisting of subject knowledge, support and guidance and learning analytics, which together make up the entirety of all didactical process.
- **Delivery** – consisting of the qualities of place, pace and timing of delivery of the content; in other words both the extent of physical and online provision and the question of the timing of key events (e.g. start and end points of learning processes) are included in ‘delivery’.
- **Recognition** – consisting of both assessment and credentialization, which are formal processes leading to recognition of learning achievements. Assessment is a phase of evaluation at certain times in a learning process, while credentials are awarded on completion of formal learning units. In both cases, these evaluative processes entail a formal endorsement of learning and lead to recognition of achievement of the learner by third parties.

But how are these core processes affected by technology? To answer this, two dimensions were used for each of the core processes, which both speak of new types of flexibility made possible through digitalisation.

- **Organisational flexibility:** The quality of *flexibility* is a question of “what” and “how” and relies on digital technology to reduce the need for physical presence; from static to dynamic and changing due to specific circumstances. So, each of the three central processes (content, delivery, recognition, and their sub-processes) can also be described by the extent to which they are delivered in a flexible manner, harnessing digital technology, i.e. through online and technology-enhanced learning environments.
- **Procedural openness:** The quality of *openness* is a “who” question and relies on how the principle of *openness* is integrated (in various ways) into the core processes (content, delivery, recognition, and their sub-processes); from closed group to open network. More open processes mean less limitations on who has access to and who delivers or controls content, delivery, assessment and recognition (cf. Hegarty 2015). This quality is not reliant on digital technology, but may be enhanced by it. For instance, an open enrolment to higher education provision can be further enhanced through building a digitally-connected network of peers, who can also develop content and assessment together.

This conceptual model with the name ‘OOFAT’ is represented in **Figure 1**. It comprises the three central processes of higher education provision at its corners and has the two qualities of flexibility and inclusiveness

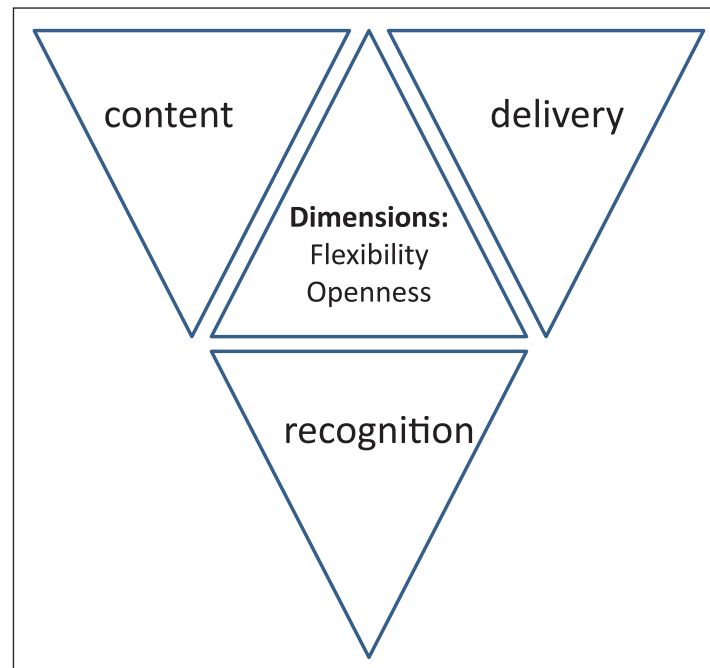


Figure 1: The OOFAT conceptual model.

at its centre. Using this overarching model, each institutional case could be described and differentiated by how it implements the three central processes and by what role flexibility and the principle of inclusiveness play in execution and delivery.

With this comprehensive model of delivery of higher education products and services, a broad selection of providers could be captured and similarities and differences in their provision highlighted for comparison. This marks a difference to the approach taken by other researchers, such as Garrett (2016) for the Commonwealth of Learning, who distinguished his cases based on specific additions to a basic model of open distance learning – e.g. the emerging cases he analysed were additionally for-profit, had a focus on OER and MOOCs or focused on adaptive learning. The intention of our research was to capture a wide range of different types of providers in a standard classification scheme, which especially highlighted how technical flexibility and the principle of inclusion were being implemented.

3. Method

In order to gain a global picture of variances in OOFAT deployment, a survey was chosen as the primary method of initial data collection. The survey was developed using the conceptual model in **Figure 1** to derive a set of descriptive elements shown in **Table 1**. The design of the survey was informed by literature analysis and previous surveys used by the Open University UK.

The survey was designed to elicit responses which would help to classify the different cases. These were closed responses and required the respondent to make a choice within a fixed framework of options (including a business model typology based on Taran *et al.* 2015). It was designed only in English, and several iterations were tested for clarity with the study's global advisory group. To counterbalance the element of subjective judgement, the

survey also asked the respondent for more detailed justification of the information provided. **Figure 2** illustrates this approach: Question 37 asks for categorization on a Likert scale and Q38 invites justification for the judgement made.

In February 2017, the global online survey was launched to capture key information and data from higher education providers utilizing flexibility and inclusive processes in their provision models. Survey participation was promoted through multiple channels, including blog posts, social media and the postings in a newsletter. While the survey aimed for senior staff members to complete, this was not always possible. The 'universe' under investigation comprised any university, but due to the focus of ICDE membership and the links of the authors it was particularly focused on established providers of distance and online education, although these were often hybrid providers, mixing campus-based education with distance or blended provision.

Cases were selected from all types of higher education providers according to the following selection criteria:

- Geographic: A global balance with representation from around the world was sought
- Ownership: Cases from both private and public-sector providers and mixed models
- Organisational: Cases which describe collaborations between institutions, singular institutions and organizational sub-units.

While the survey generated a lot of interest, in a large number of cases respondents did not complete all the questions. Therefore, during the field phase, which ran from February until the end of July 2017, the authors also contacted specific institutions to encourage them to provide more complete responses.

Table 1: Descriptive elements in the conceptual OOFAT model.

Category	Sub-categories	Dimension: flexibility	Dimension: openness
Delivery of higher education (of “interaction services”)	Access to content	How flexible is delivery by time/location/pace?	How open is the institution to all learners (i.e. also those not enrolled formally)?
	Access to guidance and support	How flexible is access to full support?	Who can access support? Who can provide support?
Content	Resources	[not applicable]	How open is the provision of content? (i.e. who determines the content, is co-creation being used, is it personalised or the same for all learners)?
	Assessment	Is assessment static, and one size fits all?	Are there restrictions on who can be assessed? Who does the assessing (e.g. peer review)?
Recognition	Content and process	Can different elements contribute to recognition? Are there flexible paths to recognition?	Is recognition available from multiple groups or only from one body?

OOFAT: Recognition & Assessment

37. How flexible is assessment for each learner assignment?

This question focusses on the organisation of learning assessment. Low flexibility of assessment means that time, place and pace are dictated centrally, whilst high flexibility means that such constraints are relaxed, and the learner can determine these largely themselves.

- 1 (not flexible; fixed)
- 2
- 3 (somewhat flexible)
- 4
- 5 (highly flexible; adapted to learner requirement)
- [not applicable]

38. How flexible is the assessment process?

Please justify the evaluation you made in the previous question.

Figure 2: Example of OOFAT survey questions.**4. Respondents**

The data set collected over 150 responses from 36 countries. A key criterion for use of the data in this report was that each respondent described their OOFAT model by answering the required block of nine questions on their model of provision. Taking this as criteria for inclusion of HEIs in the main analysis, the 150 responses were reduced to 69 HEIs. This number was further reduced for some analyses, because of the need for responses to specific questions.

Although this sample cannot be assured to be representative, it provides sufficient scope across a broad spread of practices to extract explorative models of adoption. **Table 2** shows the mode of studies by size of institution within the sample, where there is a tendency for mega-universities (with more than 100,000 enrolled students) to be primarily online or distance providers, with campus-based HEIs more common in mid-sized institutions.

Table 3 shows the spread between HEIs by funding source. In the sample, publicly funded HEIs are present in all three sectors by delivery modes, while privately funded HEIs are especially common as providers of primarily online programmes.

In terms of the types of technology that were in use, the survey responses shown in **Table 4** highlighted some general trends. The three most frequently mentioned technologies are those which can be most directly aligned with the core processes of content, delivery and recognition, i.e. OER for content development, Learning Management Systems (LMS) for content delivery and online assessment for recognition of learning. It is, furthermore, notable that all provider types mention the use of social media and mobile learning as part of their services – this suggests they are using new technologies to improve their interaction with and between learners (see below).

5. OOFAT Models

The survey presented Likert scales (1–5) for the nine dimensions included in the OOFAT model (e.g. see Question 37 in **Figure 2** above) and asked respondents to score their institution's provision according to these. The closer the score is to five, the more flexible or open the dimension is. Diagrammatic representations were created from these responses.

For example, the survey results for the Open University of Korea (with approx. 140,000 students) provide the

Table 2: Mode of provision by size of institution.

Size of institution by number of enrolled students	Primarily online providers (n = 21)	Primarily distance and correspondence providers (n = 9)	Primarily campus-based providers (n = 17)
More than 100,000 (n = 10)	5	5	0
20 – 100,000 (n = 12)	4	1	7
1 – 20,000 (n = 15)	5	3	7
Less than 1,000 (n = 4)	3	0	1
<i>no data</i>	4	0	2

Data based on 47 cases, which provided full details on all dimensions of the OOFAT model and their prime mode of delivery.

Table 3: Mode of provision by main funding source.

Source of funding	Primarily online providers (n = 21)	Primarily distance and correspondence providers (n = 9)	Primarily campus-based providers (n = 17)
Mainly private revenues (n = 13)	9	1	3
Roughly balanced revenues from private and public sources (n = 1)	1	0	0
Mainly public revenues (n = 30)	9	8	13
<i>no data</i>	2	0	1

Data based on 47 cases, which provided full details on all dimensions of the OOFAT model and their prime mode of delivery.

Table 4: Use of various technologies by main mode of higher education provision.

	Primarily online courses (n = 21)	Primarily distance and correspondence courses (n = 9)	Primarily campus-based courses (n = 17)
Online Assessment	Very frequently	Used selectively	Very frequently
Open Educational Resources (OER)	Very frequently	Very frequently	Very frequently
Learning Management System (LMS)	Very frequently	Very frequently	Very frequently
Mobile Learning	Very frequently	Very frequently	Frequently used
Social Media	Frequently used	Very frequently	Very frequently
Massive Open Online Course (MOOC)	Frequently used	Frequently used	Used selectively
Videoconference	Frequently used	Frequently used	Frequently used
Learning Analytics	Frequently used	Used selectively	Used rarely
E-Portfolios	Used selectively	Used rarely	Used selectively
Bring Your Own Device (BYOD)	Used selectively	Used rarely	Frequently used
Wikis	Used selectively	Used rarely	Used selectively
Teleconference	Used selectively	Used selectively	Used selectively
Blogging and micro-blogging	Used selectively	Not used	Used selectively
Digital Badging	Used rarely	Not used	Used rarely
Artificial Intelligence	Used rarely	Not used	Used rarely

Legend: data based on 47 cases, which provided full details on their OOFAT model and their prime mode of delivery. Data ordered by frequency of deployment in primarily online course providers. Survey asked for multiple responses. Definition of terms: used very frequently = more than 75% of all HEIs in group; used frequently = by 50%–75% of HEIs; used selectively = by 25–50% of HEIs; used rarely = by 1–25% of HEIs; not used = zero responses.

following model in **Figure 3**. This shows an institution, which states that content delivery is open (i.e. not only available to those enrolled at the institution, but delivery is

not flexible, i.e. it is subject to specific regulations on time, place and pace of the programme of study). According to the respondent, a certain level of organisational flexibility

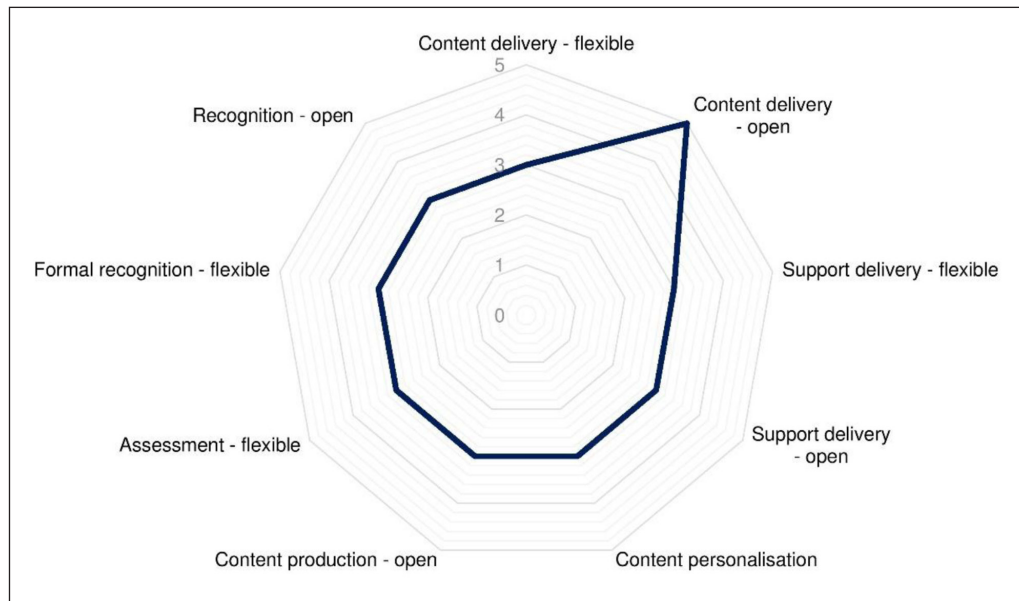


Figure 3: Dimensions of the OOFAT Model of Korea National Open University.

Interpretational aid: The score of this HEI is 5 for openness of content delivery, which means that the access is not limited to enrolled students. The score for all other areas is 3, which means that the university is active in all these areas, but they have not been prioritised.

and inclusiveness is offered for all dimensions of its higher education provision. This is consistent with the institution being an open university. In contrast, the respondent scores for Universitas Terbuka in Indonesia (with approx. 40,000 students) highlighted only flexibility in content and support delivery to enrolled students.¹

In general, indeed, the two dimensions where high values in the OOFAT model were found, were in flexible content and support delivery. The ones with the lowest levels were in the area of recognition, with low overall levels of flexibility and openness in terms of recognition.

Looking at individual dimensions in more detail:

- For content delivery nearly 60% of providers characterised organisational access to their course materials as very flexible to highly flexible, meaning there are few constraints to access in terms of time and place for students. The share is similar for access to course support.
- In contrast, assessment and recognition tend to be neither technically flexible (e.g. anytime and anywhere) nor open in terms of who determines the conditions for assessment and recognition. This is not surprising, since higher education tends to be highly regulated for assessment, often as part of external (e.g. state-led) quality assurance procedures. Examples of leaders in making assessment more flexible are Amity Online University from India, the Open University of Tanzania, which is implementing an examination on demand system, and Athabasca University from Canada, which focuses on challenge exams. However, comments to the survey indicate the many HEIs are working on this area and it is an emerging practice.
- The question on content production focused on who is involved in the process – from purely in-house

design and implementation, to external collaboration, to some learner-generated ‘personalised’ content (which is an argument often used in connection with OER). The survey shows that around one third of HEIs are generating content in-house, while a larger share collaborates on content design and production. Leading examples are the OERu from New Zealand, oncampus from Germany and the Open University of Nigeria (NOUN), which all focus on OER to provide such open processes of content development. It is noticeable that many of the community colleges from the USA that took part in this study, are moving towards more externally generated materials and combining these with the opportunities for adaptation in-house. Typical for this development was the following comment: “We are in early stages of a shift from centralized publisher produced content to decentralized OER content. At this time, OER is a combination of in-house and external production and sharing. OER is used by 12% of all students. This has doubled in the past year. It is expected to double again this coming year.”

Our data collection method makes it possible to represent and compare organisational approaches visually. The visual representations can be used to reveal distinctive aggregate patterns. The specific aspects of an individual HEI’s model may vary, but their common responses suggest that they have a common strategic direction. This clustering was conducted manually by two persons independently to find patterns which suggest a coherent grouping. Analysis of the responses revealed six different categories of technology usage, which are named to emphasise the dimensions that are strong according to the OOFAT model:

- OOFAT at the centre
- OOFAT for organisational flexibility
- OOFAT for a specific purpose
- Content-focused OOFAT model
- Access-focused OOFAT model
- OOFAT for multiple projects

OERu uses open source software, makes all its content available as OER, and offers pathways where students can study their first year of an undergraduate course for free in self-study, and this will then be formally recognised by selected HEIs, allowing transfer into the formal education system. Open practice across all dimensions of the OOFAT model sits at the core of the OERu mission.

5.1. OOFAT at the centre

This model can be visualised as a perfect, or near perfect, nonagon (with a scoring of 3 or higher on each dimension), suggesting that OOFAT is not implemented for one specific purpose, or market, but as an integral part of the institution’s overall mission. Overall, ten HEIs follow this approach to OOFAT usage. An example is the OERu, shown in **Figure 4**. The OERu network of institutions offers free online courses for students worldwide with OERu partners providing ways for learners to gain academic credit towards qualifications from recognised institutions. The

5.2. OOFAT for organisational flexibility

Many OOFAT visualisations suggest support for flexibility in higher education provision across all dimensions of the conceptual model. Six HEIs were aligned to this approach. An example is the College of the Canyons (COC), whose profile is shown in **Figure 5**. It is a public two-year community college that operates within the Santa Clarita Community College District. In terms of content, it is currently shifting from in-house content production to decentralized OER content production and reuse. For delivery,

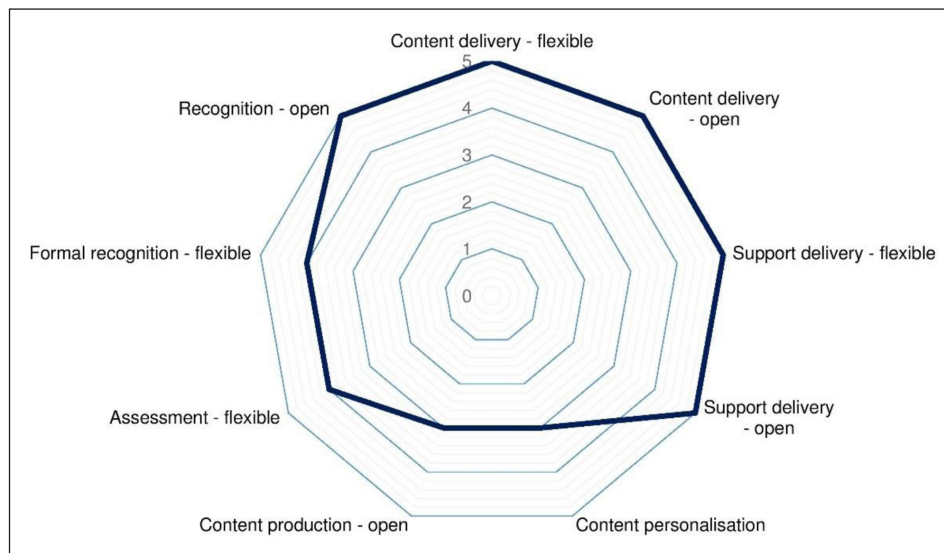


Figure 4: Example of OOFAT at the centre – OERu, New Zealand.

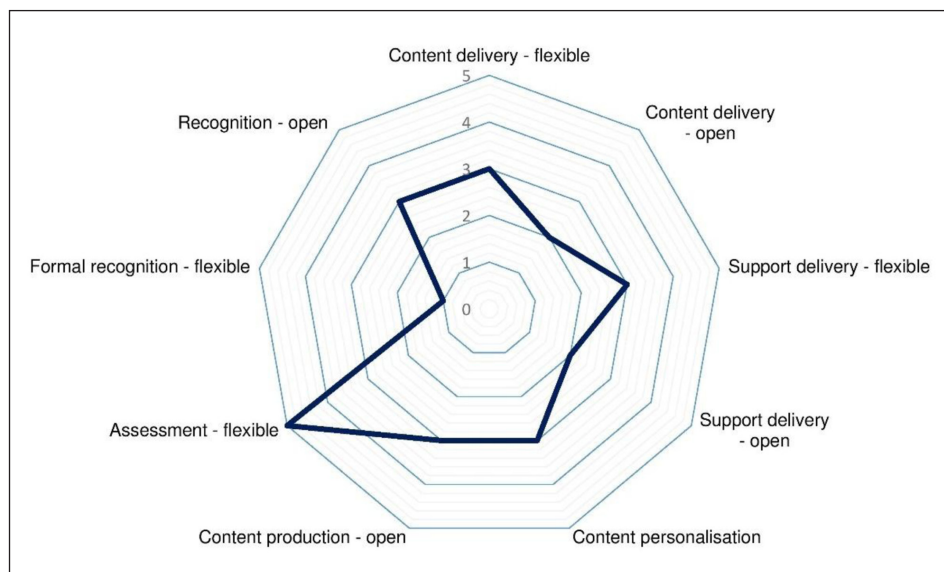


Figure 5: Example of OOFAT for organisational flexibility – College of the Canyons, USA.

students can choose between various schedule formats (16, 12, 8 or 5 week terms, on campus, online, hybrid etc.). Within these classes, the majority of students can choose time and place of assessments. Enrolment is open entry.

5.3. Content-focused OOFAT model

In contrast to the flexibility model which emphasizes the flexibility dimension across all aspects of the OOFAT model, other providers concentrate on the dimension of content specifically. This content-focused approach is the smallest category according to the OOFAT visualisation, with only three cases. An example is the National Open University of Nigeria (NOUN) shown in **Figure 6**. NOUN is a federal open and distance learning institution located in Abuja. NOUN encourages its staff to utilise OERs in their lessons and create OER for publication and reuse. Content is available online and in print, and learners work at their own pace. With a focus mainly on adult learners, support is also flexible and offered when needed in a traditional distance educational model.

5.4. Access-focused OOFAT model

Some providers are utilising digital technologies with the primary intention of increasing access to content or education for specific sets of learners. Overall, seven higher education institutions (HEIs) follow the access-focused approach according to the OOFAT visualisations. **Figure 7** shows the profile of Odisha State Open University (OSOU), a distance learning state university located in Sambalpur, Odisha, India. They have a distance education approach, but are particularly exploring the use of OOFAT dimensions in terms of improving access. The university has an OER policy with a standard practice of encouraging lecturers to adopt, adapt, contextualise and even translate existing content – and to offer the same possibilities to other users through open licensing. Content is free for all but, for certification a nominal fee is charged from eligible learners. Faculty and part-time counsellors provide learning support at dedicated study centres. Academic counsellors also evaluate the learners. The system is open and flexible for learners to self-pace their learning path in terms of study time.

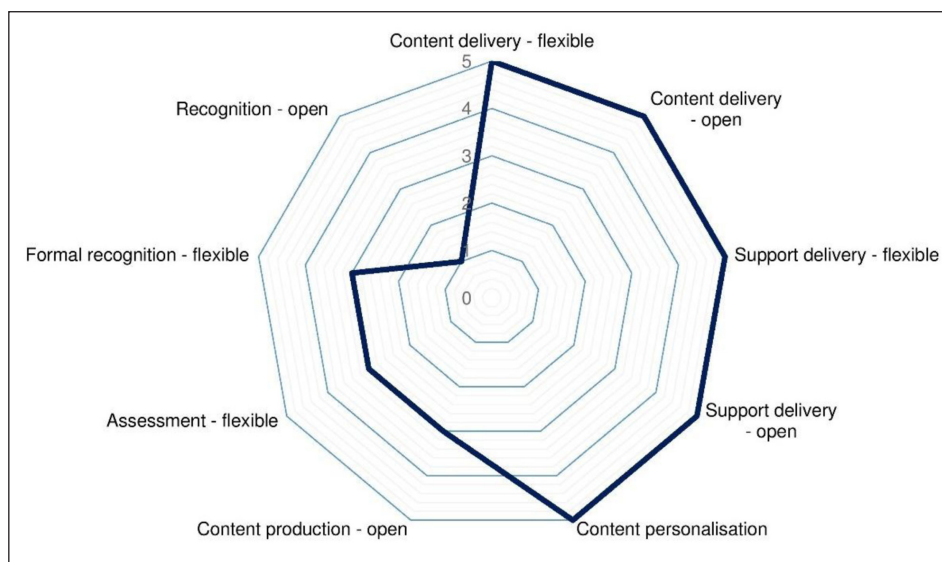


Figure 6: Example of content-focused OOFAT – National Open University of Nigeria (NOUN).

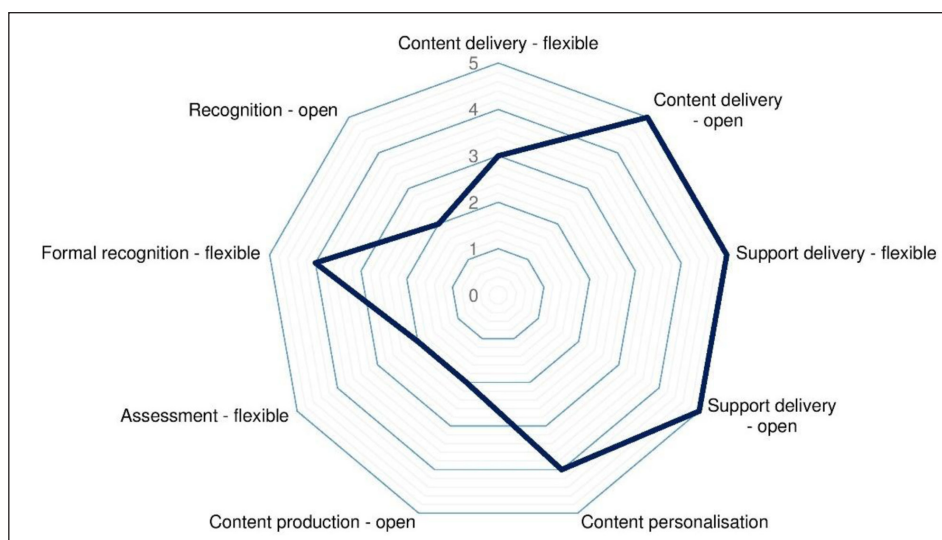


Figure 7: Example of access-focused OOFAT – Odisha State Open University, India.

5.5. OOFAT for a specific purpose

Regardless of the values given to other dimensions, many providers had at least one clear peak, where flexibility and/or openness was being implemented for a very specific function or market. This may be the result of a particular project or a specific strategy to target one aspect of delivery. For example, the Universitas Terbuka (UT) is Indonesia’s 45th state university and employs an open and distance learning system to widen access to higher education to all Indonesian citizens, including those who live in remote islands. Only recently (since 2017), has the university begun to provide digital learning materials and it now gives free internet access via Wi-Fi to students. Here, the OOFAT visualisation suggests an early stage of adoption, with content delivery the primary focus as shown in **Figure 8**.

5.6. OOFAT for multiple projects

Lastly, some OOFAT visualisations revealed multiple peaks, which were related to very different initiatives within the institution, suggesting experimentation with different

dimensions of higher education provision, before the possible future development of a unified strategy. An example is Thompson Rivers University (TRU) in Kamloops, British Columbia, Canada, which has a large online, open education programme as shown in **Figure 9**. A highly innovative university, it deploys a wide range of technologies at small-scale. For instance, students may choose their own assignments or projects in many instances and frequent use is made of blogging platforms for assessment. Open textbooks are an increasing part of content development. Their delivery is often available without a start date and requires up to 30 weeks to complete.

The model ‘OOFAT for multiple projects’ was the most frequent profile as shown in **Figure 10**. This reflects the way that HEIs are adjusting their activity profiles by addressing several dimensions simultaneously in response to diverse external pressures. However, the models ‘OOFAT at the centre’, ‘access-focused OOFAT’ and ‘OOFAT for organisational flexibility’ are clearly visible in the data set and it is likely that such dedicated strategies will become increasingly frequent, as HEIs adopt more developed and

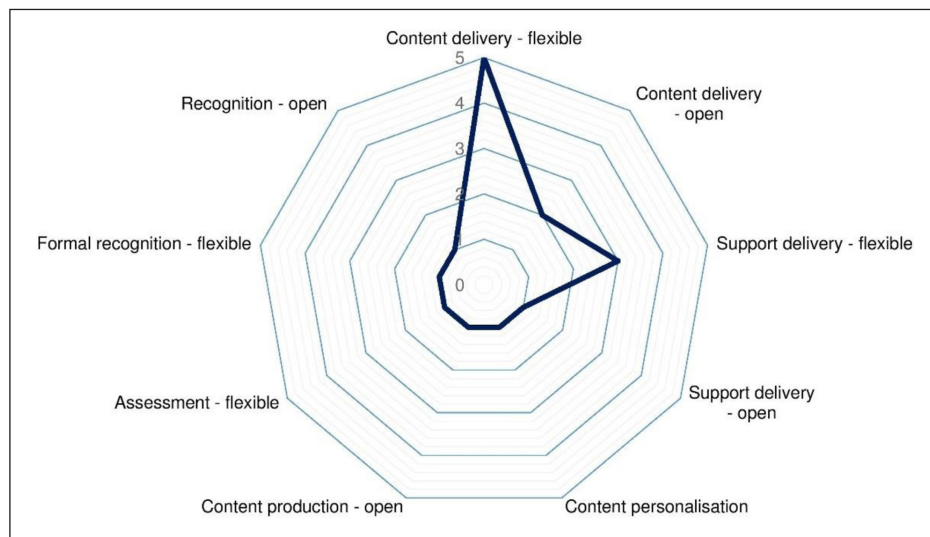


Figure 8: Example of single purpose OOFAT – Universitas Terbuka.

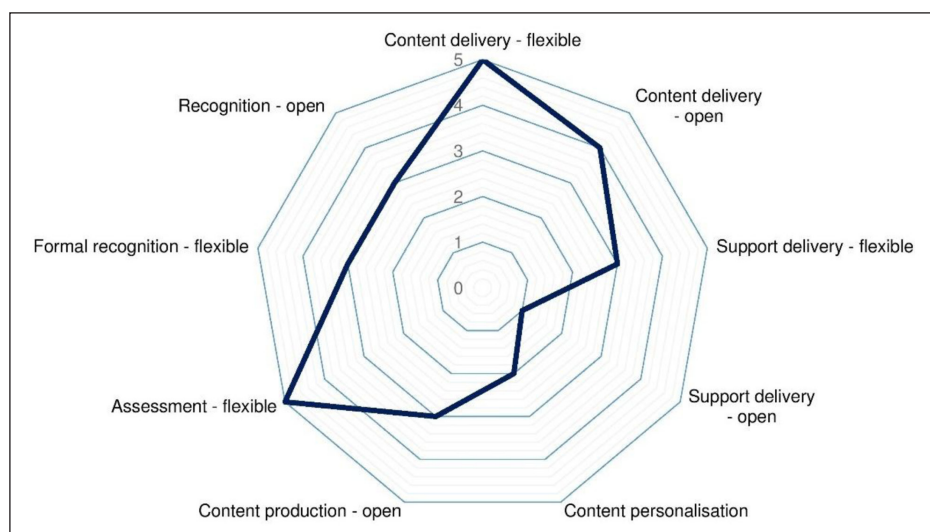


Figure 9: Example of OOFAT for multiple projects – Thompson Rivers University, Canada.

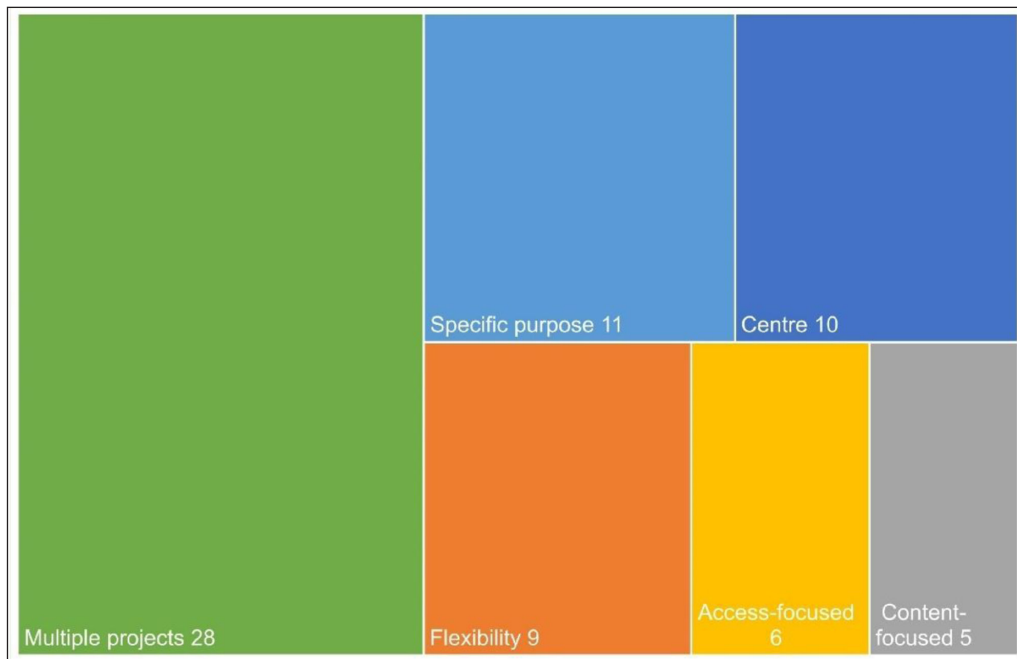


Figure 10: Spread of OOFAT models in the data set.

Note: n = 69 HEIs providing complete responses on all dimensions of the OOFAT model.

comprehensive approaches to harnessing digital technologies to make higher education provision more flexible and more open.

6. Conclusion and Discussion

Higher education institutions should be viewed as a particularly complex type of organisation, so it is highly likely that reactions to change will be iterative and diverse. This study has elicited responses to a standardised model for describing the take up of digital technologies from 69 universities across all four continents and in doing so was able to provide some insights into this practice.

Based on the explorative results, this study suggests that the majority of HEIs across the world are currently in the process of experimenting with digitalisation and applying new technologies to certain parts of their operation. The analysis reveals that there is no 'one size fits all' approach to the implementation of technology for flexibility and openness.

In terms of technology adoption, a pattern of cautious implementation emerges across the board, with a range of educational technology typically being deployed (though rarely all of them). There is a notable persistence of what might be deemed older technology. For example, Learning Management Systems (LMS) are pervasive, and Wikis are still prevalent, especially in campus-based providers. Online providers are by their nature deploying many of the technologies in their core model. The more traditional distance education providers are likely to use technology to supplement their existing model rather than in pursuit of new innovations. Campus-based institutions tend to implement technologies for a specific need, such as trialing MOOCs in a specific discipline. This insight is highly relevant as a caution to interpreting studies, which state how many years until the implementation of a specific technology can be expected. For

instance, when in 2017 the New Media Consortium's Horizon Report predicted that adaptive learning would take less than a year to be widely adopted (Adams Becker *et al.* 2017) – it should be noted that such statements neglect both context and strategies of individual universities and colleges.

The 'disruption' model of technological change in education, which promotes one universal revolution in application does not seem to be borne out, but rather a mixed economy with diverse approaches to OOFAT is observed. Technology adoption is highly dependent on context, institutional structure and is nuanced to meet needs of different learners and aims. It is perhaps fairer not to argue that universities are reluctant adopters of new technology, as some have suggested, but rather that it must be deployed within the context of pedagogic, business and support models to meet specific needs.

Some HEIs may indeed want to achieve the 'OOFAT at the centre' model, where digitalisation is being harnessed to give a high level of organisational flexibility and a high degree of procedural openness. In this case, any learner can participate at any time, and part of this learner experience is the development of content for others, supporting others in their learning and contributing to endorsement of others through peer assessment. However, this need not be the goal of all HEIs. Other HEIs might decide that their strategic objective is less radical, and they will focus on making participation more accessible, without new initiatives around recognition.

As well as providing an analysis of the current global context, this research also provides a means of approaching future directions for HEIs as they consider their strategy and operations. HEIs can use the typologies developed in this study either to determine their current position or to decide which type of model they aspire to

having. By examining the practice of other institutions with models they aspire to, they can adopt appropriate strategies and engage in peer learning with these respective universities and colleges. The value of this model is in providing a framework that can be used in an HEI as the basis for a discussion around strategy. The discussions the model generates are a key element of this process. It is unlikely for example that all staff will agree on scores when completing the questions in the OOFAT survey, and this can facilitate discussion around different perceptions. Similarly, when deciding where the HEI should seek to move to, the benefit will lie in the debate that use of the models fosters.

This work provides a basis for such comparisons and a common framework, but cannot be considered exhaustive. It should also be noted that throughout the survey, respondents made a self-assessment of their institution, which may not be objective and could be contested by another member of that institution. Furthermore, while in most cases the person filling out the survey was an institutional leader of the HEI s/he was entering responses for, this was not always the case. Therefore, the results should be interpreted as showing the breadth of strategies and practices across the globe and not taken as fully representative of parts of the world or specific types of institution.

Note

¹ All case study sheets and the full report can be downloaded from <https://oofat.oerhub.net/OOFAT/>.

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Competing Interests

Martin Weller is co-Editor-in-Chief of JIME. He was removed from all editorial processing for this submission. The authors declare that they have no additional competing interests regarding this research.

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