MOOCs in Logistics – Preliminary Data on University Curricula Coverage

Tarvo Niine\(^1\), Franca Cantoni\(^2\), and Miguel Córdova\(^3\)

\(^1\) TalTech School of Business and Governance, Tallinn, Estonia
\texttt{tarvo.niine@taltech.ee}
\(^2\) Department of Social Sciences and Economics, Università Cattolica del Sacro Cuore, Milan, Italy
\(^3\) Department of Management Sciences, Pontificia Universidad Católica del Perú, Lima, Peru

Abstract. After a decade of MOOC and open education development there is an abundance of available online content. The aim of this study is to find out whether the MOOC landscape in logistics has grown to a point of topically covering entire university curricula worth of topics. Provided the affirmative outcome, this would mean greater competition but also greater opportunities for universities teaching logistics programs to apply blended learning. We present an overview of logistics-related material on three major platforms totaling 95 courses and compare a sample of five logistics curricula against this list to demonstrate the extent of coverage by online material as well as to point out the gaps. The data suggests that the current status of logistics MOOCs can mostly cover more introductory and broader managerial-type programs but not material on logistics operations in-depth. Also, MOOCs tend to struggle with more interdisciplinary topic approaches. The findings allow to discuss on the nature of identified gaps as well as to encourage and foresee continuous growth of blended learning.

Keywords: MOOCs · Open education · Logistics curricula

1 Introduction

Online courses, a technological novelty only a decade ago, are quite commonplace today with global accessibility and multiple competing platforms offering broad array of choices. The focus of this paper is to observe whether the MOOC landscape in logistics has already grown to a point of topically covering entire university curricula. Provided the affirmative outcome, this would mean both a greater level of threat but also greater level of opportunity for universities teaching logistics programs. Provided, however, that coverage gaps are observed, it begs the question whether they are mostly random by nature and therefore perhaps filled in near future, or, alternatively, there are some systematic obstacles that would make the MOOC landscape to be relatively better equipped in some topic areas and much less so in other areas, which would indicate at least a longer process of bridging with perhaps more targeted actions assumed. Logistics and Supply Chains organizational fields represent a proper opportunity for
this study due to the long history of conceptual growth and evolution, starting from a transport-centric view to advanced logistics operations in global supply chains [1], and from supply chain management to newest sustainable supply chain management discipline towards sustainability goals and ethical behavior [2].

The study is organized as follows. The next section provides an overview of the literature related to MOOCs and how various treatments have seen MOOCs interacting with formal higher education. The third section describes the method applied in the study. The fourth section presents findings from analyzing courses of five examples of logistics curricula from universities in Estonia, Italy and Peru. Finally, the fifth section concludes the paper, highlighting implications for academia and practitioners as well as raising further questions for researchers in the field.

2 Studies on MOOCs and Formal Higher Education

In the period of 2010–2015, where the MOOC landscape took form of platforms with international appeal, MOOCs were seen as a disruptive force to education. Disruptive to the extent that it was described as a direct threat to education institutions with lesser resource base [3]. Clearly, this has not realized to groundbreaking extent and so we see university courses and MOOCs co-existing – sometimes in a more competitive setting, but also often in a collaborative setting. This section provides a brief look to the linkages between the two worlds.

As the prime stakeholder of MOOCs is the student, it is important to understand what motivates the students of MOOCs to take the courses. According to Shapiro et al., in a study about MOOCs of chemistry and statistics, the main motivators were personal (knowledge, interest, convenience) as well as career (work, career change). While about 30% of students also mentioned “certificate” as a reason, it was still a less significant argument even than “fun” (about 50%). [4] Other studies have concluded similarly [5, 6]. This suggests that there is a relatively low linkage between MOOCs and formal higher education pursuits, which can be interpreted as notable growth potential for MOOCs to further boost motivation, participation, contribution and success.

A broad coverage of relationships between MOOC movement and higher education was presented by Schuwer et al., which charted broadly opportunities and threats. Notable opportunities treated were collaboration potential, acceleration of online learning, existing policies and European ECTS framework, marketing potential and using MOOCs as innovation test-bed, while lack of recognition, quality concerns, innovation-hindering regulation, missing evidence and low completion rates were pointed as threats. In addition, “availability of multiple platforms for adopting MOOCs is tangled with a threat of too much fragmentation”. [7] On a similar theme, Nortvig and Christiansen have analyzed institutional collaboration on MOOCs and pointed out advantages in terms of ensuring quality and innovation in the common learning designs. According to their study, noteworthy barriers to institutional collaboration are reluctance of institutions to engage due to fear of competitive concerns and the teachers’ hesitancy or even resistance to new educational platforms and formats [8].

Inamorato dos Santos et al. propose a similar tally of open education motivators and growth barriers. Some key motivators listed are increased access, development of
teaching strategies and learning technologies. The obstacles are mostly focusing on the academia side: lack of shared vision, passive resistance and time constraints, additional training requirements and financial sustainability. Still, the authors point out that almost half of the institutions in their study are involved in open education and find that open education practices are increasingly significant in higher education in Europe. [9] Sandeen has noted that a growing number of colleges and universities are experimenting with various MOOC integration and credit-recognition models, but with approaches as diverse as the institutions themselves. The physical exam option by edX and certificates involving identity identification by Coursera are examples how MOOCs can be appealing to an institution considering acceptance of open education for credit transfer [10]. A common theme through these studies appears to be cautious optimism.

A specific type of MOOC in which locally produced and third-party MOOCs are integrated into traditional courses are known as hybrid MOOCs (H-MOOCs). Perez-Sanagustin et al. have proposed an H-MOOC framework with two key dimensions of MOOC variety: curricular content alignment and institutional support [11]. This approach emphasizes ways how MOOCs can be utilized by higher education institutions (HEIs). This further supports the idea and trend of unbundling in education – that, by and large, learning ought not to be based on a single fixed block of content input. Moskal et al. have pointed out that blended approaches tend to have higher student satisfaction than both face-to-face teaching and fully online teaching as well as lower dropout rates. However, the authors caution that to implement blended learning properly is not a course-level consideration but an institution-wide strategy, facilitated with proper resources and clear vision, in order to become a transformational force [12].

Rothe et al. have provided a study on the business models and development trajectories of platforms of MOOC provision. The authors categorize three business models: Premium Services (free access, pay for certificate), Professional Degrees (packages providing entry to a professional career) and Corporate Training (packages aimed at corporate employee training rather than individuals). [13] While this approach shows that MOOC platforms can also be viable businesses without credit recognition by HEIs, it can also be proposed that recognition is a significant hurdle to broader acceptance of MOOCs. In one recent study of 50 institutions providing MOOCs in China, only a small proportion of providers were found to provide quality management and monitoring [14]. This indicates that recognition can sometimes be a non-trivial process and there is development room for both MOOC providers as well as HEIs.

According to Witthaus, recognition is a key aspect of opening up education by transition from non-formal to formal education. The authors provided an open learning recognition traffic light model, which lists six elements for MOOCs to facilitate recognition by HEIs – learner identity verification, supervised assessment, quality assurance, informative credentials, credit points and collaboration with recognizing institutions. The model came with a dedicated recommendation to “ensure policies on validation and recognition of non-formal learning embrace open education and MOOCs”. [15] The challenge of recognition is further reflected by the issue that there does not appear to be a universally accepted quality model for online and open education. Ossiannilsson et al. have presented a comparison of 15 models, concluding that all reviewed quality systems suffer certain deficiencies [16].
The legal framework of e-learning has been extensively covered through a timeline view by Salajan and Roumell. The authors point to emergence of an increasingly coherent and formal approach to supporting e-learning initiatives from initially cautious and tentative steps to progressively formalized policy documents. The authors suggest that the policy focus of 2010s has shifted away from continued emphasis on ICT, with relegating it to the status of supporting structures [17]. A possible way to interpret this would be to see e-learning not so much as a stand-alone entity but that the domains of e-learning and traditional learning are fusing both de jure as de facto.

A strong counterpoint to MOOC-related optimism has been made by Reich and Ruiperez-Valiente, who analyzed Harvard and MIT courses on edX from 2012–2018, pointing out that the numbers of new unique users to courses turned to decline after 2016. Their study notes that “rather than creating new pathways at the margins of global higher education, MOOCs are primarily a complementary asset for learners within existing systems” [18]. From the perspective of academia, this suggests that the worlds of MOOCs and HEIs are somewhat closer than traditionally perceived. According to Belleflamme and Jacqmin, MOOCs are not replacing incumbent institutions but are pushing teaching practices to evolve [19].

3 Methodology

As pointed out by various studies, most of MOOC-related research has been concentrated at the student level [20–22]. In contrast, this study focuses on the viewpoint of university as an external stakeholder and potential beneficiary – here not as a direct provider of MOOCs but as an agent being able to recognize MOOCs as part of studies as well as integrating MOOCs in classroom in various blended ways. In this study, the research goal is to observe the MOOC landscape in the area of logistics with the intent to chart the topical coverage of MOOCs by comparing them against a small sample selection of university curricula in logistics across the world. The assumptions of willingness and ability are important constraints of the study. They are both practical concerns that a university, faculty or a local program head might be not able to leverage MOOCs in credit recognition process due to administrative hurdles or that a program head or teacher might mistrust MOOCs, perhaps for quality reasons, or is unwilling to blend the materials for other considerations – such constraints fall outside the scope of this work. We are asking the question – if a university is both able and willing to embrace MOOCs, what is the maximum application potential of it as of writing this research (in April 2020) across particular selected curricula in logistics.

In this study, we are approaching MOOCs and curricula quantitatively, estimating the topical coverage and linkages without taking into account quality considerations. It is acknowledged that the input data to this study is limited and that our conclusions can only be as reliable as our input data.

This study was conducted following three consecutive phases – mapping, selection of sample curricula and comparison. In mapping phase, a list of courses and relevant video material was compiled. In this study, the mapping process was limited to three platforms: edX, Udemy and Coursera. It is acknowledged there are more relevant platforms out there), but we believe that the current sample pool allows to identify
sufficient patterns. Our work on extending and updating the database is continuing. The three platforms were selected based on personal experiences as well as student suggestions as they host online material in a wide range of disciplines to a worldwide student body. As the study was carried by a global perspective, only material available in English language was considered. Search was made with the following keywords: logistics, transport, supply chain, operations, inventory, vehicle, traffic, mobility. It is curious that in this mapping process, we could not directly rely on platforms’ own search tools. The typical case was that a keyword search outputted manifold more results than what were actually topically relevant. Such design, it can be speculated, is the result of platform marketing efforts – to push discovering more courses and support the perception of abundance. This meant that the mapping process was both iterative (keyword by keyword), as well as browsing through piles of “false positives”.

Altogether, 95 material packages were documented. The term package here suggests that it is difficult to draw the line, what is the smallest size (as well as the presence of other defining elements) to really call it a proper MOOC. Here, we adopt a pragmatic view: all available titles were included that were topically suitable and had a minimum length of the video material of 3 h. Clearly, a 3 h package would not carry the title “course” in a formal education setting. However, the smaller packages are also relevant for blended learning purposes, especially in the areas of this total coverage.

The typical organizational model varies between platforms. On edX, the courses are mostly free to audit and a charge is applied only for a certificate. There are both time-limited MOOCs and courses available all the time. We found 31 topical courses hosted by edX for a total amount of 1825 h of estimated student effort. On Coursera, pricing is for certificate and applies either lump-sum or a monthly fee principle. 29 logistics-themed courses were found for a total of 480 h’ worth of videos. On Udemy, 35 elements were listed totaling 267 video hours. While on average they are significantly smaller to an average title on other two platforms, this allows also more niche approaches and less generic titles. On Udemy, typical offerings are from private experts, which is aligned with a somewhat lower access fee.

In terms of most active institutions, our mapping identified MIT (8), Rutgers (7), Delft (6) and Illinois (5). The list of all 95 MOOCs is extensive and was therefore omitted from this paper but the authors are happy to share it on demand, as well as the specifics of which course connected to which topic area in the evaluation phase.

After the mapping phase, the following concerned selecting sample curricula. At this preliminary stage of research, two considerations were prominent. One was focusing on programs that the authors have first-hand experience with. The second stemmed from the approach of “four types of logistics curricula” that were categorized in a cluster analysis approach in a study in 2015. This study proposed the four distinct types of logistics curricula as: business administration with logistics branch, interdisciplinary logistics management, transport management and logistics engineering [23]. The ambition was to cover all four types, however, in this study due to practical limitations, the study is limited to samples of first three types.

We present an analysis of five logistics curricula in this paper to explore different educational contexts: two from Estonia, two from Italy, one from Peru – three programs on undergraduate and two on graduate level.
The comparison of programs and MOOCs first focused on each individual logistics-themed course in the program and listing the MOOCs with a topical linkage, judging MOOCs by title, the description and content headings and formal courses by their stated learning outcomes and expected content. This was followed by evaluating the outcome to see, if there were topics intended to be treated in courses, which were apparently left uncovered by the linked MOOCs. In evaluating the overall coverage, it seemed appropriate to use a 4-step scale: no coverage (0%), scarce supply (less than 1/3 of topics covered), moderate supply (1/3 to 2/3 coverage), strong supply (over 2/3 coverage), proposing that this is as detailed as such observation can be for practical purposes.

There are a few more acknowledged limitations. The first being that in time, both the intended material in formal courses as well MOOC material is aging and therefore some currently defined linkages might not stand the test of time (especially concerning technology topics). Secondly, it is possible that some MOOC descriptions do not necessarily represent the content 100%. The authors did not meet such significant cases during the study. We are relying here on the assumption that while there might be occasional discrepancies between MOOC content and intended content, we position that this discrepancy is not greater than the occasional discrepancy between ILOs of a formal course and the topics what the teacher is actually covering in class. In other words, this study carries the assumption that an average academic teacher in the classroom is as reliable as an average MOOC teacher (as far as our sample platforms are concerned).

4 Findings

Here we present findings from evaluating the MOOC database from the topical connections perspective against five logistics curricula:

- Curriculum #1 – Business administration with logistics and supply chain specialization, undergraduate level, TalTech School of Business and Governance, Estonia;
- Curriculum #2 – Logistics, undergraduate level, Estonian Entrepreneurship University of Applied Sciences;
- Curriculum #3 – Supply Chain Management and Digital Innovation (SCHMIDT), graduate level, Università Cattolica del Sacro Cuore, Italy;
- Curriculum #4 – Global Executive Master in Operations and Supply Chain (GEMOS), Polimi, Italy;
- Curriculum #5 – Management and Top Direction, Pontificia Universidad Católica del Perú, Peru.

Curriculum #1 is a 3-year full-time program in TalTech, one of the largest universities in Estonia. The students split between five majors, one of which is “logistics and supply chain”. As the program is built upon broad business foundation, it dedicates ~20% of attention to logistics topics with 6 courses, all 6 ECTS and including 40–64 h of classroom activity. How these courses link to MOOC database is shown in Table 1.
As the intended material coverage on this curriculum is rather introductory compared to more specialized logistics programs, the overall linkage to MOOCs is strong and approaching full coverage. The main topical gap appears to be in transport arrangements – out of 4 courses linked in Table 1, only one (#35) is dedicatedly about transport regulations and the downside of that particular specimen is that this MOOC is too specific (for the general audience in this context) and more appropriate for graduate level.

Curriculum #2 is a 3-year program in Estonian Enterpreneurship University of Applied Sciences, a private school located in Tallinn, Estonia. This program is also built upon general business foundation, but includes logistics-specific courses more prominently and has a dedicated transport focus – to an extent that the students are eligible to take “FIATA diploma in Freight Forwarding” (a recognized vocational certificate) exam. We separated 52 ECTS of logistics courses (Table 2) from the foundational courses.

### Table 1. Linkages between curriculum #1 and MOOCs

| Curriculum course                        | Connected MOOCs | Evaluated coverage |
|------------------------------------------|-----------------|--------------------|
| Logistics and inventory management       | 15 courses      | Strong supply      |
| Transportation and forwarding            | 4 courses       | Scarce supply      |
| Purchasing management                    | 16 courses      | Strong supply      |
| Operations management                    | 7 courses       | Strong supply      |
| Logistics technologies                   | 17 courses      | Strong supply      |
| Management of logistics enterprise       | 16 courses      | Strong supply      |

### Table 2. Linkages between curriculum #2 and MOOCs

| Curriculum course                        | Connected MOOCs | Evaluated coverage |
|------------------------------------------|-----------------|--------------------|
| Foundations to logistics                 | 7 courses       | Strong supply      |
| Logistics systems and cost management    | 27 courses      | Strong supply      |
| Land transport                           | 6 courses       | Moderate supply    |
| Rail transport                           | 1 course        | Scarce supply      |
| Water transport                          | 0 courses       | No supply          |
| Air transport                            | 0 courses       | No supply          |
| Multimodal transport                     | 2 courses       | Scarce supply      |
| Foundations of forwarding                | 3 courses       | Scarce supply      |
| Risks in logistics                       | 3 courses       | Moderate supply    |
| Manufacturing logistics                  | 8 courses       | Strong supply      |
| Purchasing and inventory management      | 13 courses      | Strong supply      |
| Material handling and warehousing        | 2 courses       | Scarce supply      |
| Customs regulations                      | 2 courses       | Scarce supply      |
| Passenger travel                         | 1 course        | Scarce supply      |
It is clear that current MOOCs are much less able to cover more specific and more transport-focused topics than more general managerial and “big picture” views. Table 2 still lists a number of courses applicable, but often, the linkages are weak and contribution remains secondary. The gaps are notable in transport mode specific topics both concerning physical world of operations (capabilities, performance characteristics) as well as administrative, regulative and direct managerial implications of transport operations (such as costs, efficiency, analytics). Another shortcoming appears to be in the field of warehousing and material handling. It appears like the MOOC landscape of logistics is tilted towards broad perspective topics than actual physical operations.

Curriculum #3 is a master level program at the Faculty of Economics and Law, Università Cattolica del Sacro Cuore in Italy. The program is structured into four interdisciplinary teaching modules in Table 3.

| Curriculum course                                      | Connected MOOCs | Evaluated coverage |
|--------------------------------------------------------|-----------------|--------------------|
| Supply chain management and digital innovation         | 7 courses       | Moderate supply    |
| Supply chain planning                                  | 42 courses      | Strong supply      |
| Market, marketing and supply chain management          | 10 courses      | Moderate supply    |
| Supply chain innovation: regulation and policies       | 15 courses      | Moderate supply    |

The core courses are well covered by MOOCs. Topics such as the managerial approach for supply chain in Industry 4.0, leadership and team management, projects and decision support systems for supply management, technologies for the digitalization and innovation are all areas of interdisciplinary approach. Such perspectives are, at least currently, not widespread on the MOOC landscape. While one can find good material to mix and match to an extent, there is usually no single ready-made solution.

Curriculum #4 is a 12-month part-time program taught on campus at two European schools, MIP Politecnico di Milano in Milan, Italy, and EADA Business School in Barcelona, Spain. The program focuses on delivering in a highly active and hands-on manner, emphasizing “learning by doing”. Teaching includes business cases, and simulations, with students constantly working on real-life business cases and strategic decisions. The program has four relevant modules: operation management 4.0, digital operations management, sustainable supply chain management and innovative supply chain management. A module of leadership skills was omitted from our analysis due to being more foundational than logistics-specific (Table 4).

| Curriculum course                         | Connected MOOCs | Evaluated coverage |
|-------------------------------------------|-----------------|--------------------|
| Operations management 4.0                | 28 courses      | Strong supply      |
| Digital operations management             | 4 courses       | Moderate supply    |
| Sustainable supply chain management       | 9 courses       | Moderate supply    |
| Innovative supply chain management       | 6 courses       | Moderate supply    |
The keywords of content are mostly present in MOOCs. Similarly to Table 3, viewing process management topics from perspectives of sustainability and innovation are good examples of areas where online content is not extensive. It is also relevant to note that the more a program is designed to be hands-on and applicable in learner’s own practical context, the more difficult it would be to rely on a MOOC format. Still, there is a lot of available material to recommend as additional optional sources.

Curriculum #5 is a 5-year undergraduate program in Pontificia Universidad Católica del Perú. The program is built upon organization management foundation and includes three logistics and operations specific courses: operations management, logistics management, and international commerce management (the latter is an optional course). The 3 logistics courses are shown in Table 5.

| Curriculum course                          | Connected MOOCs | Evaluated coverage |
|-------------------------------------------|-----------------|--------------------|
| Operations management                     | 9 courses       | Moderate supply    |
| Logistics management                      | 31 courses      | Strong supply      |
| International commerce management         | 3 courses       | Scarce supply      |

Topics uncovered by MOOCs in Operations Management course are: processes management, processes flowcharts, SIPOC methodology, stochastic simulation of discrete processes, material requirement planning, and linear programming optimization. Even when SIPOC and stochastic simulation, and linear programming are specific topics that could be outside of our key words used for searching, we expected to find coverage on topics such as processes management, processes flowcharts, and material requirement planning, because these appear closely related to our search patterns.

Regarding the Logistics management course, it results as strongly supplied with MOOCs. The only topics uncovered were megatrend in logistics and SCOR methodology, and we argue that the first one is an introductory subject, and the second one is specific methodology that could have been outside of our search range.

Finally, the International commerce management course was scarcely supplied, being partially covered just by three MOOCs from our list. One of the missing topics was local regulations for international trade, which we argue is also due to local focus and language barrier – if such course would exist, it probably would not be in English.

5 Conclusion and Discussion

It appears that while the MOOC landscape is much heterogeneous, the landscape of logistics curricula is still notably more heterogeneous. From competitive view between MOOCs and HEIs, this makes sense – the more faculty programs have local unique characteristics, the less they link with MOOCs, where M stands for “massive”, suggesting more standardized approach. Broadly, our study echoes that MOOC development has turned out slower than initially anticipated. The situation on the MOOC landscape in logistics topics shows some notable gaps, such as in terms of freight.
forwarding and international trade regulations, specific handling and warehousing topics but also interdisciplinary perspectives, where process and tech views (automation and digitalization) are linked to human elements of leadership, teamwork and change.

For the former, we propose two explanations, what really are sides of the same coin – demand and supply. The first obstacle is smaller market demand. It appears there is an order of magnitude more “supply chain management”-focused topics than directly transport-focused topics. Perhaps it can be suggested that “it is cool to be a generalist rather than a specialist” and that many MOOCs are much driven by popular demand (and more than the desire to fill knowledge gaps). For the latter, it is interesting that interdisciplinary topic treatments are not “mainstream” on MOOC landscape. Perhaps it is a matter of time – as competition is expected to increase between MOOCs, topical differentiation seems logically a potent strategy.

Let’s turn to future. It can be assumed that MOOC landscape will keep growing and the main reason is that the motivation of students is probably growing and MOOCs will be there to follow the demand. Watted and Barak have categorized MOOC-related student motivators as personal, career and educational benefits [24]. Today, the situation is that most students are taking MOOCs because of personal interests or due to perceived career impact, but not for the credits to be recognized in formal learning. Why? Partially because a notable proportion in academia is not recognizing it. There are clearly systematic benefits and synergies if more of academia would give proper credit to online learning. Should there be formal educational benefit added to the mix, all the involved stakeholders (students, universities, MOOC providers, employers and society) would benefit.

Of course, this line of thought has been around for some time and efforts have been made while progress is still slow to come. However, it could be proposed that after 2020 the changes might speed up. This study was conceived way before the COVID-19 pandemic. However, writing this in the middle of pandemic, it appears that the idea of HEIs working together with open education is more relevant than ever. Many universities involved in pandemic areas, which also covers the homes of all three authors of this paper around the globe, were pushed into distance teaching. A vast number of teachers needed to handle delivering content and achieving ILOs in a non-contact situation. This could impact the average mindset and boost the understanding that if an average teacher could handle the situation (and our experiences are a positive indication), then surely it is easier to give credit to MOOC teachers who have been doing pretty much the same thing, only that in some cases with years more preparation and experience. Also, not only students but many teachers probably turned to MOOCs for aid in crisis, getting to know the MOOC landscape better and discovering ways how to integrate this into their own courses. While not all these experiences might have been positive, surely many of them were a much-needed help. All in all, awareness would, over time, increase experiences, good experiences boost acceptance, which in turn allows to draw the formal education world and open education closer together and kick-start the synergies. This is the “optimistic progress track” guiding this study. Finally, with more recognition, more MOOCs will appear. The teachers with successful online experimentation, might be interested in “scaling up” and create their own MOOCs (while others would leave their content locked on university platforms).
If MOOC recognition would become mainstream, it would boost the demand also for the current gap areas which we speculated is a partial result of a lack of demand-pull.

In terms of future, we suggest that universities will not disappear, but will adapt. Imagine this line of thought: a 100% face-to-face program would always see value added in adding online elements, due to arguments of superior accessibility, flexibility, efficiency and perhaps also broader networking reasons. Similarly, a 100% online program would always see value added elements in also involving face-to-face elements. The optimal balance point needs to be somewhere between those two extremes. This leads us to conclude by lending support to blended learning. From university viewpoint, the current MOOC situation, even with the coverage shortcomings, still offers a potent boost to enrich the learning experiences for logistics students. Therefore we propose that a key message of this study is to recommend raising awareness and encouraging teachers and directors of logistics curricula to seek ways on how to integrate the relative abundant availability. The digitalization of education ought not to be seen as a threat lowering intake to classical universities, but as an opportunity to embrace tech not only remain relevant but to further their own advantages. Perhaps the pandemic has also served as an innovation boost for universities, which would be a silver lining.

Our findings shed light on which could be the gaps between universities curricula and MOOCs content regarding logistics. However, we believe that the number of curricula examples and analysed MOOCs are an important limitation. Hence, we encourage other researchers to leverage our findings for further research in the field of MOOCs and online learning as a whole, using a larger sample of curricula, different geographical areas of study, and other organizational fields, in order to provide additional insights of which are those gaps, how universities are bridging for them, and how a broader digital revolution would fill or expand them.

References

1. Southern, N.: Historical perspective of the logistics and supply chain management discipline. Transp. J. 50(1), 52–64 (2011)
2. Fritz, M.: Sustainable supply chain management. In: Leal Filho, W., et al. (eds.) Responsible Consumption and Production. Encyclopedia of the UN Sustainable Development Goals, Springer, Cham (2019)
3. Ng’ambi, D., Bozalek, V.: Massive open online courses (MOOCs): disrupting teaching and learning practices in higher education. Br. J. Educ. Technol. 46(3), 451–454 (2015)
4. Shapiro, H.B., Lee, C.H., Wyman Roth, N.E., Li, K., Çetinkaya-Rundel, M., Canelas, D.A.: Understanding the massive open online course (MOOC) student experience: an examination of attitudes, motivations, and barriers. Comput. Educ. 110, 35–50 (2017)
5. Milligan, C., Littlejohn, A.: Why study on a MOOC? The motives of students and professionals. Int. Rev. Res. Open Distrib. Learn. 18(2), 92–102 (2017)
6. Loizzo, J., Ertmer, P.A., Watson, W.R., Watson, S.L.: Adult MOOC learners as self-directed: perceptions of MOOC motivation, success, and completion. Online Learn. 21(2), 1–24 (2017)
7. Schuwer, R., Gil-Jaurena, I., Aydin, C., Costello, E., Dalgaard, C., Brown, M., Jansen, D., Teixeira, A.: Opportunities and threats of the MOOC movement for higher education: the European perspective. Int. Rev. Res. Open Distance Learn. 16, 20–38 (2015)
8. Nortvig, A.-M., Christiansen, R.: Institutional collaboration on MOOCs in education—a literature review. Int. Rev. Res. Open Distrib. Learn. 18, 306–316 (2017)
9. Inamorato dos Santos, A., Punie, Y., Muñoz, J.C.: Opportunities and challenges for the future of MOOCs and open education in Europe. In: From Books to MOOCs? Emerging Models of Learning and Teaching in Higher Education, pp. 81–92. Portland Press, London (2016)
10. Sandeen, C.: Integrating MOOCs into traditional higher education: the emerging “MOOC 3.0” era. Change Mag. High. Learn. 45(6), 34–39 (2013)
11. Pérez-Sanagustin, M., Hilliger, I., Alario-Hoyos, C., Kloos, C.D., Rayyan, S.: H-MOOC framework: reusing MOOCs for hybrid education. J. Comput. High. Educ. 29, 47–64 (2017)
12. Moskal, P., Dzubiha, C., Hartman, J.: Blended learning: a dangerous idea? Internet High. Educ. 18, 15–23 (2013)
13. Rothe, H., Täuscher, K., Basole, R.C.: Competition between platform ecosystems: a longitudinal study of MOOC platforms. In: ECIS 2018 Proceedings, 134. AISeL, Portsmouth (2018)
14. Liu, M., Zha, S., He, W.: Digital transformation challenges: a case study regarding the MOOC development and operations at higher education institutions in China. TechTrends 63(5), 621–630 (2019)
15. Witthaus, G., Inamorato dos Santos, A., Childs, M., Tannhäuser, A., Conole, G., Nkuyubwatsi, B., Punie, Y.: Validation of non-formal MOOC-based learning: an analysis of assessment and recognition practices in Europe (OpenCred). Joint Research Centre Science for Policy Report. EUR 27660 EN (2016)
16. Ossiannilsson, E., Williams, K., Camilleri, A.F., Brown, M.: Quality models in online and open education around the globe: state of the art and recommendations. ICDE Reports Series. International Council for Open and Distance Education, Oslo (2015)
17. Salajan, F.D., Roumell, E.A.: Two decades of e-learning policy evolution at EU level: motivations, institutions and instruments. Eur. J. Educ. 51(3), 391–407 (2016)
18. Reich, J., Ruiz-Pérez-Valiente, J.A.: The MOOC pivot. Science 363, 130–131 (2019)
19. Belleflamme, P., Jacqmin, J.: An economic appraisal of MOOC platforms: business models and impacts on higher education. CESifo Econ. Stud. 62(1), 148–169 (2016)
20. Ebben, M., Murphy, J.: Unpacking MOOC scholarly discourse: a review of nascent MOOC scholarship. Learning 39(3), 328–345 (2014)
21. Veletsianos, G., Shepherdson, P.: A systematic analysis and synthesis of the empirical MOOC literature published in 2013–2015. Int. Rev. Res. Open Distrib. Learn. 17(2), 198–221 (2016)
22. Zhu, M., Sari, A., Lee, M.: A systematic review of research methods and topics of the empirical MOOC literature (2014–2016). Internet High. Educ. 37, 31–39 (2018)
23. Niine, T., Koppel, O.: Typology of logistics curricula – four categories of logistics undergraduate education in Europe. Int. J. Eng. Pedag. 5(2), 4–11 (2015)
24. Watted, A., Barak, M.: Motivating factors of MOOC completers: comparing between university-affiliated students and general participants. Internet High. Educ. 37, 11–20 (2018)