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# Depover, C., Orivel, F. (2012). *Developing countries in the e-learning era* (Vol. 96). Paris: UNESCO IIEP.

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## Introduction

This review will depart from the standard format of a review, which usually starts by giving a brief summary of the reviewed item. Given that the book is readily available online at [this URL](#) and includes a good advance organizer in its introduction (pp. 17-18) we will skip this task and directly turn to discuss the book.

I will further depart from usual practice by shortly introducing my own conceptual framework since it may help to understand better my comments on the book.

## Conceptual Framework

Traditional distance education has developed around a deficit: the lack of *responsive interaction*. At the time *responsive interaction at a distance* was not a technologically available option<sup>1</sup>. There was telephony but, not allowing the exchange of text or graphics; it obviously could not carry the full load of the usually required instructional transactions. As a consequence of this deficit traditional distance education developed an instructional approach *sui generis* (Peters, 1994) which shifted the principal *locus* of teaching and learning away from student-teacher interaction to content development. In this model the interaction was to be designed *into* the material in the form of (for instance) in-text questions or in-text activities (both cases of *student-content interaction*), whereas *student-teacher interaction* was left to tutors who played a subsidiary (albeit important) role<sup>2</sup>. This instructional approach led to the organizational consequences, which Peters so succinctly captured in his *industrialization formula* (Peters, 1994). This industrial mode of distance education translated into a cost-structure<sup>3</sup> lending itself to *economies of scale*. This point got considerable publicity through various publications by Daniel (e.g., 1996, 1998) who saw the mega-universities as proof that distance education could break 'the iron triangle' of cost, quality and access: through investment in sophisticated course material distance education would safeguard quality while, at the same time, the quality material could be replicated at low costs to make it accessible to many students. In this construction, expanding access would lead to lower *average costs per student* because it allowed spreading the possibly substantial costs of development of course material over a larger student base. The British Open University, especially, served as a reference that this model could work. However, in more traditional educational quarters the lack of responsive interaction at a distance continued to be seen as the Achilles Heel of distance education.

The digital technologies emerging rapidly in the nineties made (for the first time in the history of education!) *responsive interaction at a distance* possible. However, it soon became clear that, while largely addressing the deficit of student-teacher interaction, it challenged the whole rationale of traditional distance education<sup>4</sup> and, most importantly, seemed to drive horses through its cost-structure and, in consequence, to the claim that traditional distance education would be the most cost-effective form of educational provision.

It is helpful at this point to revisit the relation between *instructional approach* and *cost-structure*. According to Holmberg there are two *constituent elements of distance education* "subject-matter presentation (usually in print), which represents one-way traffic, but, if developed well, simulates communication, and "student-tutor interaction (in writing, on the telephone, by e-mail, fax, etc.)." (Holmberg in Bernath et al. eds., 1999, p. 101) Any instructional approach is characterized by how these two constituent elements are configured, i.e., which emphasis is given to 'subject matter presentation' (development of course material) as compared to student-teacher interaction. Since the *two constituent elements of distance education* translate into the *two 'constituent cost parameters of the principal cost equation'* (F and V), the instructional approach defines the cost-structure, i.e., the relative weight in F and V in the total cost equation TC.<sup>5</sup>

Digital technologies offer new 'affordances' for both, *course development* and *interaction*. Based on a distinction

earlier made by Rumble (2004), Hülsmann suggested distinguishing between various ways of using the affordances of *information and communication technologies (ICT)*<sup>6</sup>: Exploiting the power of *information-processing* and programming today allows levels of student-content interaction, out of reach to earlier distance educators. Such applications (which include multiple choice questions, computer marked assignments, simulated interaction) were called *type-i applications*. Where digital technologies are rather used for providing and sustaining a *communication* bridge between student and teacher (or among students) they were referred to as *type-c applications*. Both ways of using ICT, use the Internet as a platform for instructional transactions and hence would qualify as e-learning.<sup>7</sup>

## Malleability of E-Learning Cost-Structures

Depover & Orivel define e-learning as “online learning via the Internet” (p. 22).<sup>8</sup> Assuming that this is meant as interpreting e-learning as making good use of responsive interaction at a distance, in the above terminology this translates into identifying e-learning with type-c applications: *e-learning type-c*.

However, the authors themselves observe elsewhere that “the industrial and mass media models ... may perfectly well be compatible with dissemination over the Internet” (p. 32) Using the above developed terminology this may be interpreted as conceding that *e-learning type-i* is an option: In this case the course materials are provided in digital formats (with built-in student content interaction), while the *level* of student-tutor interaction (though conducted over the Internet) can remain basically the same. We could nickname such a version of e-learning a ‘digital correspondence model’. It is very different from the ‘virtual seminar model’, which would use the same technology but a rather different *instructional scenario* (Bernath & Rubin, 1999). It may, indeed, be surmised that the ease by which e-learning has been absorbed by leading distance teaching universities has to do with exactly this option of digital correspondence.<sup>9</sup>

Even where the capabilities of digital technologies for *responsive interactions at a distance* are not fully exploited, there are a number of advantages afforded by ICT other than those directly related to student-teacher interaction. The point here is, that using the Internet as a platform for teaching/learning transactions allows very different scenarios, including some of a very distinct cost-structure. Depover & Orivel themselves admonished the reader to “avoid thinking that a model that is no longer in fashion has no educational value. ... The worst approach would be to make choices based on slavish devotion to a particular model or technological solution. ... The fact that in this booklet we have chosen to emphasize learning via the Internet does not mean that we regard this as the obligatory path for DE in developing countries.” (p. 32) Neither is e-learning the obligatory path for distance education in developing countries, *e-learning itself is highly malleable and leaves considerable room for choices and showing a considerable malleability of cost-structure*. Table 1 compares the cost-structures of DE and F2F education with various forms of e-learning:

**Table 1. Instructional Scenarios and Cost-Structures**

	<b>Student-content interaction</b>	<b>Student-teacher interaction</b>	<b>Student-student interaction</b>	<b>F</b>	<b>V</b>	<b>TC=F+V*N</b>
<b>Traditional/ industrial DE</b>	Course quality vested in content development; ideally high quality; but can vary considerably.	low level	none	FDE high	VDE low	scale economies
<b>Face-to face teaching (F2F)</b>	Course quality vested in interaction between student and teacher (and among peers).	high level	high	FF2F low	VF2F high	no scale economies
<b>E-learning type-c</b>	Course quality vested in interaction; often low level of sophistication in course development; initially dearth of media diversity; mainly text based.	high level	high	Ftype-c low	Vtype-c high	no scale economies

<b>E-learning type-i</b>	Course quality vested in content development; ideally high quality; but can vary considerably.	low level	depends on design	Ftype-i high	Vtype-I low	scale economies
<b>E-learning type-i/c</b>	e.g. e-learning with cost-control:	moderate level	moderate level	Ftype-i/c varies	Vtype-i/c varies	may allow moderate scale economies
<b>xMOOCs</b>	Course quality vested in content development; ideally high quality; but can vary considerably.	zero level	organized by students	very low	very low	scalable without scale economies

Notes: For discussion of xMOOCs cf. below

Comparing the rows for DE and F2F one sees the different cost-structures of the two instructional approaches: where cost parameters are high for DE they are low for F2F and vice versa; similarly, type-c applications and F2F share the same cost-structure, as also DE and type-i. According to Depover & Orivel Ftype-i may even be smaller than FDE, due to falling costs of hard- and software and falling costs of programming.<sup>10</sup> (On the other hand insisting on quality standards also may raise and keep fixed costs of development high.)

Figure 1 illustrates some of these points: there are forms of e-learning which have a similar structure than traditional (industrial) distance education (e.g. e-learning type-i). This is reflected especially in the parallel lines depicting the industrial mode of DE and e-learning type-i (that the graph of e-learning type-i is lower than that of Industrial DE reflects the falling costs of programming assumption) or the parallel lines of as face-to-face education and e-learning type-c. Depover & Orivel's *e-learning with cost control* would combine type-i features (low fixed costs of development due to massive drop in IT costs) and type-c features keeping variable cost per student below the level of face-to-face education (reflected in the lower gradient of e-learning with cost control as compared to face-to-face education.<sup>11</sup>)

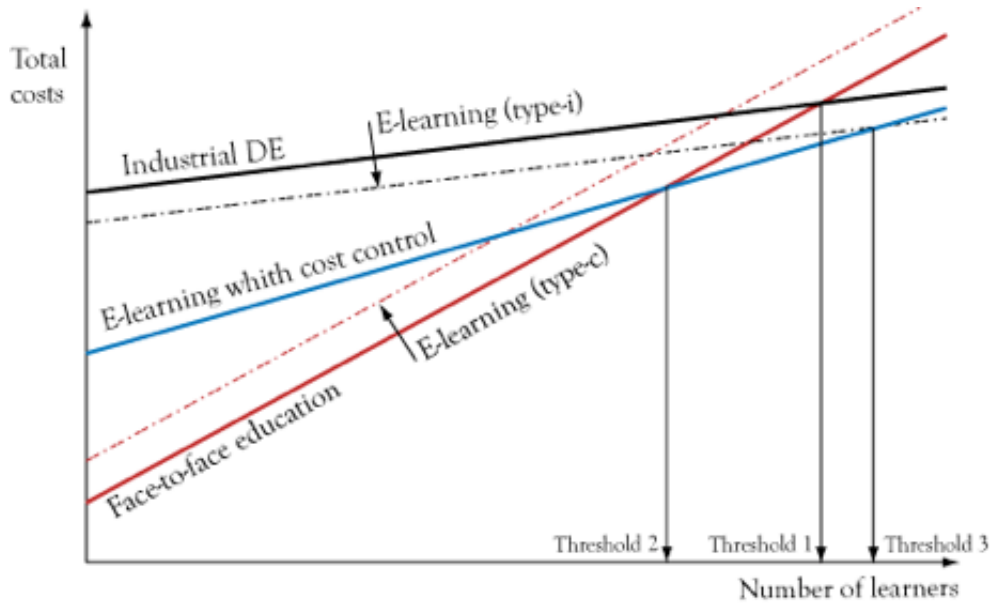


Figure 1: Graphing different cost-structures

To summarize: There is a rhetoric of linking e-learning to responsive interaction at a distance (i.e., interpreting e-learning as e-learning type-c) while in practice implementing e-learning may happen more along as e-learning type-i.

## E-learning, Convergence and the Diminishing Role of Scale Economies

Related to the above discussion is a point the authors make about scale economies: "We are witnessing the end

of scale economies, and the hope that DE would increase provision without raising budgets is fading."<sup>12</sup> (pp. 81/82) Let's start with some hair-splitting to put the relevance of scale economies in perspective: Essentially, *scale economies* are based on a significantly different level of fixed costs as compared to variable cost per student. An index for scale economies would be the ratio  $F/V$ . Since Depover & Orivel for instance indicate that fixed costs of development come down, then, other things being equal, the index for scale economies also would decrease. So what? This characteristic of declining scale economies would merely mean that the threshold when distance education out-competes the face-to-face mode is achieved earlier. Hence: scale economies should be seen as a means to achieve affordable education, not as an aim in itself. If we should aim at tuning down a specific cost-parameter at all it would be *average cost per student* (AC). Technically AC does not necessarily depend on scale economies ( $F/V$ ) but on low variable cost per student ( $V$ ). Equally, it is not *decreasing scale economies* which lead to a convergence with face-to-face education but the *rising level of V*.

Admittedly, there is a bit of hair splitting in this. By and large it is true that exploiting more fully *responsive interaction at a distance* leads to raising  $V$ , and thus would nudge the cost-structure of e-learning towards that of face-to face education and would lead to higher marginal costs (and to higher average costs per student). But still, low marginal costs depend less on scale economies than on (in comparison) low variable cost per student.<sup>13</sup>

However, there is a further reason to question the preoccupation with scale economies prevalent among distance educators: it invites the fallacy of mistaking the *average cost per student* for *total costs*. The popularity of Daniel's mantra that distance education would break the linkage between cost, quality and access intentionally blurs the distinction between these two types of costs. As Neil Butcher has pointed out: "When financial analysis is undertaken it often focuses narrowly on unit costs (that is, the cost per individual student). Such analysis depends for its persuasiveness on demonstrating declining student costs as economies of scale is achieved. ... In many instances, income analysis will reveal that there is simply no way to accommodate this increase in total expenditure." (Butcher, pp. 242-3)<sup>14</sup> Simply put: the *idée fixe* of bringing down average costs per student may lead to design systems too big and costly to run on full capacity which may, especially in developing countries, lead to unsustainable high total costs and may even result in an unexpectedly high average cost per student (e.g., if the system cannot run to full capacity). Hence, the promise that one could arrive at acceptable levels of AC without having to rely on scale economies may not be altogether bad news.

A further drawback of being tied to scale economies is that it conflicts with program diversification. Ideally mega-institutions achieve lowest average costs per student by running a comparatively small number of programs. Program diversification generally has cannibalizing side effects on the enrollment numbers of individual programs (e.g., Rumble, 1997). However, given the increasing demand for an ever broader range of specialized professional skill-profiles, not being tied up to scale economies for achieving reasonable average costs per student per program may be a good thing. But what does it mean for the mega-providers?

One could revisit the 'vulnerability debate' under the auspices of the new digital technologies. Rumble argued already earlier that conventional universities were discovering the adult education market and offering part time education to students nearby. The resulting market fragmentation would especially render the traditional mega-universities increasingly vulnerable insofar as they depend on scale economies (Rumble, 2004). Today, (almost) all universities have a reasonable ICT infrastructure and can technically teach at a distance. They can draw from a large variety of programs that can – ever more easily – be given a distance teaching format. If a fragmenting market was ever a threat for mega-institutions, one would think the threat must have increased since.

It may, however, be argued that not being so tied to scale economies to achieve a reasonable average cost per student level shields even mega-universities from part of the impact of market fragmentation: market fragmentation may lead to a diversified demand structure of the programs an institution offers— declining enrollment numbers in some programs while other programs may still attract large enrollments. Often *e-learning type-c* (with all the measures of cost control) may be a more cost-effective option for the former, while *e-learning type-i* is still an option for the latter. The new digital affordances allow handling both types of programs.

Moreover, e-learning may even allow coping with large numbers without relying on scale economies. *Scalability* doesn't necessarily depend on *scale economies*. Depover & Orivel illustrate ways to control the impact of the costs of interaction (their *e-learning with cost control*). However, tutors may not always like the ways in which such cost-control is achieved, since much of the cost-efficiency gains would come from increasing their workload, from decreasing their remuneration or from offering them more precarious employment conditions.<sup>15</sup> UMUC may be a case in point for the compatibility of e-learning type-c with scalability.

In addition there are still considerable advantages for the mega institutions, especially outside the realm of direct teaching costs, e.g., with respect to administration, hardware and software acquisition or the digital library.

To summarize: distance educators should look at scale economies as means rather than goals. The mission of

distance education was (and – for many – still is) to make affordable education available to more people, many of them previously excluded by the traditional system of higher education. Depover & Orivel show that this aim may depend less on exploiting scale economies and less on the existence of mega-institutions. This may be considered good news and even mega-institutions may be less negatively affected than the authors suggest: where appropriate, institutions can use *e-learning type-i* (e.g., the digital correspondence model) thus reducing their dependency on scale economies to achieve an appropriate cost level. The overall decreasing cost level may buffer the impact of fragmenting markets.

## Reception Costs: The Digital Divide Within

Even in developing countries, there is no doubt that at least all *higher* education requires a robust ICT infrastructure and easy access to the Internet and its resources. This applies both for conventional universities and for distance teaching universities.

The big question for a traditional distance education institution in a developing country is, if it should make access to ICT infrastructure a requirement for the learners, thereby substantially increasing the *reception costs* of students. The problem poses a dilemma difficult to escape: whatever the choice an institution might take, it leads to losing part of its audience. If it would stick to its traditional mission to serve especially the less privileged groups and accordingly cling to the traditional correspondence (or mass media) model, the institution is likely to lose the richer, ambitious, urban clientele which has all the necessary IT equipment and want to put it to use. Depending on the level of pervasiveness of ICT infrastructure in the respective country and the level of disposable income of potential students, ratcheting up reception costs by devolving the ICT costs to the students is likely to split the target group right through.

Trying to serve both groups would result in additional costs due to the redundancies and duplication this would entail. Possibly, the dilemma of losing a big part of one's audience or of losing the efficiency gains which would come with a more consequential change-over to e-learning could be processed by 'delayed gradual change'. If Depover & Orivel are right and the Internet infrastructure will increase<sup>16</sup> (UNESCO-ITU) and reception costs will decrease reasonably soon, one could expect that a staggered delayed change process could partially defuse the problem. In fact, the authors see reception costs of computer ownership dropping dramatically to even below the \$180 of the OLPC. According to the authors, Indian producers already offer laptops for \$35 and have announced plans for launching a \$10 computer. If, in addition, we could expect Internet flat rates to drop equally dramatically then, indeed, reception costs may not be a problem any more, even though \$35 still amounts to about 50% of the monthly income of a middle class household in a country like Madagascar. Moreover, as Haythornthwaite (2007) pointed out, the *digital divide* gap does not simply refer to the lack of computers and would not be dealt with even if an Internet capable machine is in the hands of all. It reproduces itself on higher levels as a difference of capabilities. The \$10 computer needs to be equipped with the necessary software to allow access to all the relevant products.

But while it may well be that IT infrastructure would reach a high level of pervasiveness, would that herald the eradication of poverty (or 'e-eradication of poverty' suggesting ICT as a cause of it<sup>17</sup>)? It may well be it rather means that we should abandon our perception of poverty, which presently suggests that the presence of computers means the absence of poverty. There is good reason to assume that we need to re-configure our image of poverty: you may have a computer and still not have enough to eat (Chen, 2012). You may even have a degree.

But if indeed the reception costs drop so significantly, would that bring back the mass audiences envisaged for traditional mega-distance teaching institutions or would they try other paths of access to education? The stark contrast between the claim of "the end of scale economies, and the hope that DE would increase provision without raising budgets is fading" (pp. 81-82) and the hype about MOOCs (ignored by the authors<sup>18</sup>) does merit a short comment.

## MOOCs: Scale Economies Reloaded

Distance education has always been accompanied by the rhetoric of social justice. Education, including Higher Education (HE), should be made accessible for all who wanted it and had the respective talents. Daniel's marketing of breaking the iron triangle of cost quality and access was in line with this rhetoric. The zero transaction costs of digital knowledge products made it appear particularly malign not to share these resources. As a consequence opening existing digital content to the public was a good publicity coup for major institutions (like the MIT and then the OU). It led to a movement in favor of open educational resources (OER) eventually coordinated by UNESCO. The OER movement can be considered a precursor of MOOCs since it treated the cost of development as 'sunk costs', i.e., costs that could — for all practical purposes — be treated as zero.

If F could be regarded as zero, what about V? In order to arrive at zero TC (thus being able to offer the MOOCs

for free), not only F has to be zero but also V. Two ways to achieve this objective have been realized by what was later labelled as xMOOCs and cMOOCs. xMOOCs did not use any student-teacher interaction while cMOOCs used a crowd sourcing strategy to bring down V to zero. xMOOCs can be considered a resurrection of the traditional DE cost-structure shifting the locus of teaching to content development and exploiting type-i instructional scenarios hence substituting student-content interaction for student-teacher interaction. We have to recall that MOOCs typically use forms of content presentation different from those of traditional (largely print-based) distance education. The preferred mode of presentation is recorded lectures (audio or video podcasts) interrupted by frequently inserted multiple-choice questions, which had to be successfully completed before the next podcast sequence could be viewed (or listened to). Like the old in-text questions these inserted activities served as 'sleeping policemen' to keep the learner engaged and prevent them from lapsing into 'couch potato' passivity. Moreover, xMOOCs also allow complementing this format of presentation with new forms of *learning analytics*, which allows the evaluation of learner performance. Automated evaluation formats allow immediate identification of error clusters allowing intervention by the course designers (Koller, 2012). This form of interactivity would not re-introduce student-teacher interaction through the backdoor; rather, it would short circuit the design cycle of course maintenance.

cMOOCs work differently; instead of taking the human element out of the loop they introduce the human element on mass scale. They eliminate the teacher (tutor) as a cost driver but heavily rely on peer interaction. Students are encouraged to form for instance, Facebook groups, and support each other in the learning process. This links back to the web 2.0 preference for the wisdom of the crowd: having thousands of students, say, in a statistics class, makes it likely there will be quite a number of students advanced students who are happy to help others. In fact, other web 2.0 strategies could be marshalled towards this aim. Some of the MOOC providers have adopted a web 2.0 business model: they offer MOOCs for free but arrange with commercial companies to view large numbers of students in action. A triple win situation, it seems: the MOOC provider gets money for opening its teaching arena for the head hunting resource managers of the commercial clients, and the high-performing students may hope for an invitation by a big multi-national company. Informing students that they get kudos for mutual support and including peer reviews as evaluation instrument may well motivate learners to get a move on.

Hence, both models of MOOCs show the following cost structure: F is regarded as zero because it is treated as sunk costs. V is zero because either human interaction is completely eliminated or, at least, the costly student teacher interaction is substituted by peer interaction. If  $F = 0$  and  $V = 0$  then  $TC(N) = 0$  whatever the number of students.

Obviously this account is slightly stylized. When MIT or the OU made their resources available to the public they had a triple motive: first, there was a genuine commitment to sharing resources; second, doing so could be considered as an excellent publicity coup; thirdly, in spite of all the rhetoric of sunk costs there was a considerable amount of money in the pipeline from the Hewlett, Soros or Gates foundations. Costs would further increase when MOOCs providers compete for 'adding value' to their services by improving assessments leading to educational badges which possibly could be traded in for credits at serious institutions.

From the vantage point of a distance educator MOOCs seem to be a resurrection of traditional distance education under the conditions of the digital era. It seemed to deliver Daniel's dream of breaking free of the iron triangle and making accessible elite education for all at zero cost. It did so by applying the same instructional design strategies of shifting the locus of teaching to course presentation and away from student teacher interaction. The affordance of digital technologies, however, allowed more sophisticated levels of student-content interaction and added peer interaction as an additional feature.

However, with inheriting the virtues of DE (such as being able to cope with large numbers, flexibility and affordability) MOOCs also inherited the vices of DE: high drop out rates and the need for a high level of learner autonomy in prospective students. Even more than DE, MOOCs seem to work better as screening devices than devices for skills formation, let alone critical thinking.

## Conclusion

The central claim in the paper under discussion is the thesis about the diminishing role of scale economies in the recent transition of DE to e-learning. The challenge implied in the thesis is due to the fact that the claim of DE and e-learning to be the most cost-efficient form of educational provision is very much based on scale economies: it is due to scale economies that DE escapes the constraints of the iron triangle which ties costs, quality and numbers together in a lock-step manner.

We found that Depover & Orivel's claim hinges on the relatively narrow definition of e-learning as a format of teaching and learning fully exploiting the affordances of *responsive interaction at a distance*. This narrow definition of e-learning would mean more student-teacher interaction and, as a consequence, a cost-structure closer to that of traditional face-to-face teaching.

However, as Depover & Orivel themselves conceded, digital technologies could be used in different ways, including scenarios fully compatible with scale economies. That the new digital technologies did not prove disruptive to the mega-universities demonstrates the considerable malleability of e-learning. This largely takes the sting out of the argument of the diminishing role of scale economies.

A further important insight delivered in the paper is the focus on reception costs especially for DE and e-learning institutions in developing countries: the digital divide is replicated within the audience of DE and e-learning institutions. Depover & Orivel have no solution for the problem but offer some rationales for expecting that reception costs of DE and e-learning will drop dramatically in the future.

As an addendum to the discussion of the role of scale economies in DE and e-learning we added a discussion of MOOCs since the attention they have received recently seems to fly in the face of any thesis attesting scale economies have a diminishing role. MOOCs, it seems, are 'scale economies reloaded': they can be considered as a radicalized version of DE both with respect to its virtues and to its vices.

## Notes

1. For the concept of 'responsive interaction at a distance' cf. Hülsmann, 2009, pp. 451-2
2. While generally teaching is seen as a form of interaction between students and teacher, Mills, former Regional Director of the OU, explicitly identifies academic teaching with course *development*: "To be absolutely clear, where learning materials are produced for numbers of students..., this is regarded as the academic teaching and is considered to be outside the framework of learner support." (Mills, 2003, p. 104)
3. The term cost-structure relates to the respective weight of *fixed costs* and *variable costs per student* in the total and average cost equation. The total cost equation, in its simplest form, is written as  $TC(N) = F + V \cdot N$ , where  $F$  are the *fixed costs* and  $F \cdot N$  the *variable costs*; hence it simply reads: Total costs are composed of fixed costs plus variable costs. Note that the variable costs  $V \cdot N$  are the product of *variable cost per student* ( $V$ ) times the *number of students* ( $N$ ), the latter being the independent variable of this function. For what follows it is helpful to remember that  $TC$  is a linear function, i.e., its graph is a straight line where  $F$  identifies its intersection with the  $y$ -axis and  $V$  signals its angle of inclination. The larger the angle of inclination the quicker the total costs rise with student numbers. The importance of  $V$  becomes clear if we analyze *average costs per student*:  $AC(N) = TC(N)/N = F/N + V$ . For big  $N$  average costs per student ( $AC$ ) approach  $V$ . The graph of  $AC$  drops asymptotically to the level of  $V$ . Hence  $V$  determines the level, below which  $AC$  cannot fall. The terminology applied to  $V$  is slightly confusing to the novice since  $V$  is referred not only to as *variable cost per student* but also as *unit costs* or, as in this context where it is the limit of the average cost equation, as *marginal cost*.
4. Why should you design your content with a clarity pre-empting most students' questions once the tutor is at the students' fingertips?
5. The discussion here looks at *direct teaching costs incurred by the institution*. Depover & Orivel also generally focus on direct teaching costs but include a discussion of reception costs, i.e. costs generally incurred by the student.
6. Hülsmann simply relabeled Rumble's distinctions Type A and Type B to render them more intuitive by linking them to the acronym ICT. It often goes unnoticed that digital technologies comprise two distinct sets (technologies of information processing and technologies for communication). For our discussion it is important that, depending from which set you take your application, it contributes more to the fixed costs or more to the Variable cost per student. This relation between type of technology used and cost-structure led to choosing the labels connected to the acronym ICT.
7. Type-c applications include student-teacher interaction as well as peer interaction. It is the first form of interaction that drives up variable costs per student. One way of making use of the communication sustaining affordances of the new technologies, while at the same time avoiding raising  $V$ , is making (hopefully) productive use of student-student communication rather than student-teacher communication. MOOCs (Massive Open Online Classrooms) avoid the latter but may encourage the former to the extent of, for instance, experimenting with peer grading.
8. It is somewhat unfortunate to define the neologism e-learning by reference to a further neologism, i.e., online learning, which is taken as well-known.
9. Especially in bimodal institutions (such as the mushrooming centers for lifelong learning), formats of *blended learning* are preferred which tend to make sub-optimal use of the interactive capabilities of e-learning: Students quickly realize that the professors in charge of the course focus on the face-to-face part leaving the online part to the tutors who, by design, play a mainly supportive rather than a teaching role. While technically the Virtual Learning Environments (VLEs) would allow seminar style approaches, both instructional design and the division of labor often lead to low level of student-teacher (and even peer) interaction.
10. The authors (in p. 64) even refer to a previous paper by Orivel arguing that due to the massive drop in ITC costs the earlier analysis in Orivel (2000) would no longer be tenable. The argument then saw little chances that ICT-based teaching solution could be affordable in developing countries.
11. Note that the affordances of the new technologies also would allow ratcheting up both fixed costs and

variable costs per student: To bring down F e-learning with cost control below FDE and Ve-learning with cost control below VF2F-c is not a consequence imposed by the nature of technology; it is result of an instructional design choice to limit both fixed and variable costs to a level considered appropriate from an instructional point of view.

12. Especially keeping variable costs per student low may not bode well to tutors. Already Rumble (2004) demonstrated that much of the efficiency advantages of distance education are due to *labor practices* such as employment conditions and level of remuneration, i.e., putting it more bluntly: more precarious employment conditions and lower wages. However, similar strategies were employed by traditional universities in order to cope with the challenges of massification. Much of the teaching load was shifted to students (some times doctoral students) who worked on contract for a fraction of the professorial salary.
13. This in itself is a remarkable statement in a year where MOOCs (Massive Open Online Classrooms) are the talk of the town. We will come back to that below.
14. Mace (1978) made this point earlier on when he recommended to the OU to abandon its cooperation with the BBC. This would lead to lower average costs in spite of decreasing scale economies. The OU did not do that possibly for good reasons: The BBC cooperation was essential to establish the public perception of the OU as a provider of quality education.
15. It may have been better to refer here to average costs per student rather than unit costs. But given that AC for large number of students converges to the marginal costs and these being identical with the average cost per student the point is still clear.
16. Cf. Rumble on the 'effect of employment practices on the costs of flexible and distance education', in Rumble, 2004 (pp.53-65).
17. Depover & Orivel cite the UNECO-ITU estimate that "every 10% in the spread of high-speed Internet access will bring an annual increase of 1.3% in GDP". (p. 81) The insinuation here seems that given such carrots governments would do their best to assure such an infrastructure expansion in order to harvest the growth. Again it is not certain if rapid growth allows expanding high speed internet (or provides a context in which it makes sense to expand it) or if expanding high speed Internet is a lever to obtain such growth.
18. Lavin, B., Zhen-Wei, Q. C. (2004).
19. This is essentially due to the fact that the time for drafting the booklet was done before MOOCs received the public attention they received a year later.

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