

ON THE RELATIONSHIP BETWEEN SOCIETY AND HIGHER EDUCATION: WHAT PATH SHOULD WE TAKE?

Abstract

The current network society, with its primacy of information and communication technologies, is challenging the higher education model. The needs and expectations of today's students differ from those of students in the past, and educational practices should adapt to modern times. But what changes will we see in the relationship between societal transformation and the higher education system? In this research paper, we set out a quantum-based model in order to analyze this relationship and to advance the understanding about the role that distance education will play in the future. Under this perspective, we provide an illustration that allows for the representation and evaluation of future scenarios.

Keywords: higher education; network society; ICT/new technologies; quantum approach; future; distance education.

Word count: 5766.

Introduction

Almost two decades ago, Windschitl (1998) outlined a research agenda for the world wide web, or www, and classroom research. He also advocated more research on student communication via the web. Years later, Greenhow et al. (2009) discussed changes in the nature of the web 2.0 (read-and-write), in comparison to web 1.0 (read-only), which provided learners with an array of new tools and choices.

Previously, Castells (1996) had introduced the idea that the development and implementation of information and communication technology (ICT) should force higher education organizations to respond to the societal trends of the knowledge economy. Nowadays, we refer to a new social structure, the so-called “network society” (Castells, 2010). In the network society, virtuality becomes an essential dimension of our reality and “timeless time” becomes a key characteristic of our way of communicating (Castells, 2010). This might provide distance education with an even more relevant role in the future. Castells (2016) illustrates the potentiality of change in this new form of society with reference to social movements.

The words (and photos) of the photographer Eric Pickersgill aptly describe the current technology-based context in which we live (see “Removed”, available at <http://www.removed.social/about>):

The joining of people to devices has been rapid and unalterable. The application of the personal device in daily life has made tasks take less time [...] In similar ways that photography transformed the lived experience into the photographable, performable, and reproducible experience, personal devices are shifting behaviors while simultaneously blending into the landscape by taking form as being one with the body

[...] *This has never happened before and I doubt we have scratched the surface of the social impact of this new experience.*

In our view, this new form of society will inevitably change both higher education and the role of distance education and, accordingly higher education institutions. Therefore, we open our paper with the question: “What path should we take?” Then, we attempt to shed light on the relationship between the transformation of society and higher education by developing a conceptual framework grounded in a quantum approach. This approach enables us to analyze the future of higher education and discuss possible future scenarios.

Transformations of Society, Higher Education and Related Organizations

Society

Our society has undergone a transformation first from an industrial to a knowledge society (Lai, 2011), and then from a knowledge society to a network one (Castells, 2010). While a knowledge society is, by its very nature, a “learning society where innovation is continuous and embedded in the culture” (Huijser et al., 2008, p. 8), a network society is characterized by a culture of real virtuality and also by “timeless time”, i.e., according to Castells, the type of time that occurs when, in a given context, there is a systematic perturbation in the sequential order of the social practices performed in that context.

In the last ten to fifteen years, technological advances have dramatically changed our daily lives, both personal and professional. We have seen, for example, rapid innovation in services such as transportation and accommodation with the appearance and development of Uber, a worldwide online transportation network, and Airbnb, an online homestay network. What is more, we often see how people prioritize digital

conversations over face-to-face communication; young people in particular prefer social network and multichannel communication to traditional and even e-mail communication (Greenhow et al., 2009). This trend seems notably difficult to reverse. Commenting on this subject almost twenty years ago, Hitt (1998) pointed out that “we will expect people to be continuously online while traveling or moving around within cities” (p. 220).

On the relationship between higher education and society, one of the most important challenges concerns the internet and the web, and how they transform the “Classroom” (Greenhow et al., 2009). In this context, Lai (2011) referred to the concepts of “changing needs” and “changing learners” and, more recently, Márquez-Ramos and Mourelle (2016) stated that future generations’ understanding of higher education will differ from that of the current generation.

Regarding one of the most fashionable terms in recent times, “competency”, we have observed the emergence of desired technological competencies, especially for students, teachers, researchers and administrators. Following Mossberger et al. (2003), people need two types of skills so as to have effective access to contemporary ICT: technical competence and information literacy. But are these competencies supposed to be an inherent ability in future generations? Is there a need for the education sector to re-organize syllabi so as to strengthen these competencies? These are important questions to bear in mind.

One of the most important consequences of this rapidly changing scenario is the need for lifelong learning: people should update their knowledge and skills during their working life. This issue has become crucial in the network society. Higher education institutions must therefore be ready to help their students develop lifelong learning competencies; online and new forms of learning play a key role in this process. Lifelong

learning, as well as being important for its own sake, also creates an increased demand for postgraduate studies. This will be one of the challenges for higher education institutions stemming from new societal demands. Together with the diversification of the student profile as a result of globalization and the massification of higher education that has taken place since the late 20th century, this poses a new challenge: a need for cross-curricula and inter/multi/trans-disciplinary projects (Lai, 2011).

In this context of globalization and the network society, advanced economies face the challenge of a strong demand for people to be innovative, creative or entrepreneurial, as well as having the ability to lead to collaborate in a multidisciplinary context and to identify and solve collective problems in a digital world (Greenhow et al., 2009). These are necessary abilities for dealing with a constantly changing society and gaining competitiveness in the global market.

Nonetheless, the interaction between the global and the micro context should be considered. As Castells (2010) points out: “The network of decision implementation is a global electronic macro-network, while the network of decision-making and the generation of initiatives, ideas, and innovation is a micro-network operated by face-to-face communication concentrated in certain places.” (pp. 36-37). These two means of communication— virtual and face-to-face—will co-exist in the future but it is not yet clear which will predominate. In light of this, we consider both potential scenarios in our proposal of a model for the future of higher education.

Higher education

A key element in our society is the speed of change, and this is also true for higher education. We are witnessing the growth of nontraditional types of learning, ranging from blended learning to learning based on any number of technological resources

(electronic, mobile, etc.). As Deming et al. (2012) point out, online education is the fastest growing segment in higher education.

Interestingly, with web-based tools, scholarship is shared with a wider audience than in the traditional scenario (Greenhow et al., 2009). The rise of virtuality in our society and the replacement of the clock time of the industrial age with “timeless time” play an important role here, making it more likely that people living in the network society will engage in distance education at some point in their lives.

Two additional aspects of the network society that have a potential impact on higher education (Dennis et al., 2002) are the massive capacity for the acquisition, storage and retrieval of information, which has distorted our idea of the limits of knowledge and subsequently affected the teacher-scholar role, and the possibility of modifying information and data by means of digitalization.

It can be argued that the way in which education will be understood by future generations of students will change in the next few years (Márquez-Ramos and Mourelle, 2016). Incoming generations of students have had continuous contact with such technologies, and as a result are referred to as “digital natives” (Prensky, 2001); in fact, some advances in neuroscience research indicate that technology may affect the development of the brain during adolescence (Lai, 2011).

We should bear in mind the role of higher education in shaping the life of young people (Huang, 2009). As such, core skills must be delivered, with one of the most important being the development of thinking skills—both critical and creative. As Huang (2009) points out, these skills become crucial in order to “survive” in a continuously changing society; in particular, this author stresses that creativity is not only an ability but also the willingness to accept change and newness.

In fact, it is easy to picture a future scenario where new generations of students have a preference for high-quality distance education, in place of traditional, face-to-face forms of higher education. This seems a realistic development since, for example, some accredited institutions accept credits gained through virtual MOOC (Massive Open Online Course) education. Furthermore, as two indications of the quality of this type of distance education courses, a MOOC was nominated for an Emmy (see Hew and Cheung, 2014; Kondik, 2015) and MicroMasters are already a reality in the edX platform (see Pugh, 2017). Authors such as Mazoue (2013), Fischer (2014) and Santandreu Calonge and Aman Shah (2016) provide further analysis and reflections on the MOOC phenomenon.

As with the transformation of society discussed above, these two forms of education—traditional and virtual—may well co-exist in the future. Again, it remains to be seen which one of these forms will predominate; both are considered in our model proposal.

Some of the challenges that higher education might face in the future are associated with challenges that science will experience in the network society. In this context, Van Noorden (2014), for example, explains how academic social networks such as ResearchGate and Academia.edu have reached levels of membership that were not expected even a few years ago. What is more, Bohannon (2016) describes how Sci-Hub, the world's largest pirate website for scholarly literature, has experienced explosive growth, meaning that the scientific community is watching the nature of scholarly communication change before its eyes. What seems clear is that changes happening in the network society are affecting not only science in a way that is not entirely foreseeable, but also higher education and distance education.

The present and future of higher education organizations

The twenty-first century society needs people able to work with knowledge and networks in a creative and innovative manner (Lai, 2011). This leads us to the role of higher education organizations: they must adapt their teaching-learning process to meet the demands of the current society. At this point, we should note how imperative it is that the novelty of new technologies does not make higher education institutions lose sight of their main objectives: equipping students with knowledge and abilities, as well as preparing them to participate in and enrich the network society. In this regard, virtual platforms and related technology can have a significant impact on the functioning of higher education institutions (Belleflamme and Jacqmin, 2016).

In terms of the emergence of ICTs and the network society in the higher education field, there are at least three stages that any educational institution must go through (Collis and van der Wende, 2002): first, the establishment of institution-wide technological infrastructure; second, a rich pedagogical use of this infrastructure; and third, the strategic use of ICT focused on specific target groups in higher education. In their study, Collis and van der Wende (2002) stated that, in many cases, the second phase was still under development. We should currently be focusing on the development of the third phase, where learning analytics—i.e., the collection, analysis and reporting of data about learners and their contexts in order to understand and optimize learning and the environments in which it occurs—plays an important role (see, e.g., the applications mentioned by Tynan, 2016).

As mentioned above, current and future learning environments might involve both physical (face-to-face) and virtual (distance) scenarios. In this sense, we have witnessed a transformation in the technologies used to support the learning process as well the administrative functions in higher education institutions. But does this necessarily indicate the effectiveness and efficiency of ICTs? The physical change is obvious:

lecture halls and seminar rooms equipped with computers (with internet access) and projectors, use of multimedia devices, development of virtual platforms, repositories and electronic devices, lectures delivered with the help of technology, etc. While these physical changes are evident, do they entail a simultaneous change regarding the philosophy of the teaching-learning process? Have we really fundamentally changed the way we think or learn? In short, is ICT simply a cosmetic change or does it represent a real change? And will ICT use in the future be merely superficial or a fundamental part of the learning process?

As Balasubramanian et al. (2009) underlined, and as we wish to highlight here, our main concern should be to ensure that ICT transforms the teaching function rather than simply supports it. Communication networks and technologies must be active in the teaching-learning process: apart from helping students to learn more efficiently, more importantly they should transform the culture of teaching and learning (Lai, 2011). The future of the use of technologies depends on them being correctly used and implemented within the teaching-learning process.

In any case, a paradox arises: while new technologies are omnipresent in our daily lives, they are not so widely-used in higher education organizations. Is such a change only a matter of time?

On the search for a new higher education model

Novelties in higher education

Apart from other positive aspects, the use of virtual and social media for educational purposes can “foster the development of more equitable, effective, efficient, and transparent scholarly and educational processes” (Veletsianos and Kimmons, 2012, p. 166); in the same vein, the use of digital technology generates societal benefits by

means of “broadening access to education and scholarship for the common good” (Veletsianos and Kimmons, 2016, p.1).

An example of a new higher education model is the European Higher Education Area, where students take a leading role and work autonomously, and the teacher acts as a manager and catalyst for knowledge (Márquez-Ramos and Mourelle, 2016). This is also an example of change regarding how learning should be facilitated in higher education: the previous focus on the teacher has shifted to the student, who plays an active role in the construction of knowledge, either individually or collaboratively.

A crucial question raised by Márquez-Ramos and Mourelle (2016) is whether internet, web-based and mobile devices are complementary tools or substitutes for traditional higher education. Collis and van der Wende (2002) claimed that web-based systems (web 1.0 at that time) were a complementary tool of traditional educational practices. More recently, Belleflamme and Jacqmin (2016) pointed out that the precise nature of the impact of the sort of education offered by virtual platforms—MOOCs in particular—will depend on whether their users view such platforms as substitutes for or complements to the traditional education system. Meanwhile, the revolution in higher education continues and, in this context, Pugh (2017) describes a new world of ‘unbundled’ learning and explains how new education models allow for flexible and innovative online credentials.

Potential and challenges of space-time for higher education: virtuality and “timeless time”

A space-time model combines space and time into a single continuum. Such models are interpreted with space consisting of three dimensions and time as one dimension, the fourth dimension. The potential of virtuality and “timeless time” in the space-time

model for higher education is clear, but are all higher education institutions capable of implementing this sort of teaching-learning model?

On the one hand, the best universities are already able to offer very high-quality specialization courses that can be completed in a fully virtual setting. There are, however, criticisms of this type of learning. Some researchers hold the student-teacher interaction to be critical to education (see, for example, Chen et al., 2013). It might be also argued that networking is one of the reasons why students prefer traditional forms of education over virtual learning. However, anyone who dismisses the value of e-networking is failing to account for the impact of social networks such as Facebook, Twitter, LinkedIn, WhatsApp or Instagram in recent years.

On the other hand, the material and human resources involved in this sort of education are costly. Institutions with more resources can create these technology-intense courses for huge audiences, which confer benefits in terms of marketing and advertising, and may create extra supply for in-person (or additional online) degrees. It is worth noting that, in its early stages, Coursera only collaborated with elite higher education institutions before signing new agreements with State universities in 2013 (Lewin, 2013).

In a future scenario characterized by the predominance of virtual learning, how will higher education organizations with limited budgets survive? And how will they adapt in terms of size, location, and so on? Will students and their families be able to afford higher fees? Also, one possible future scenario might be characterized by a higher education system with fewer universities and greater competition, as a result of globalization and the network society. Some authors even raise the possibility of a future context characterized by free access to a degree-granting curriculum, as an extreme extension of the free online courses currently available (Mazoue, 2013).

What is needed is the implementation of a higher education model that is capable of meeting the demands imposed by the new century. There is a need for new skills and abilities suited to the labor market; as a result, itineraries, curricula and teaching practices should also change. The main needs relate to efficiency, increasing transparency and accountability, and improving performance in teaching and research (Lai, 2011).

The so-called “digital divide” and “cyber-imperialism” should also be taken into account (Huijser et al., 2008) in this context. Cyber-imperialism refers to the fact that content creation on the web is currently dominated by the developed, English-speaking world. We should thus pay particular attention to potential unwanted effects in terms of inequality.

In order to study the relationship between the changes experienced by society, higher education and related organizations, and (very likely) the current higher education model, we follow Márquez-Ramos and Mourelle (2016) in supporting a quantum-based model as a suitable and powerful approach for analyzing the dynamic change the higher education institutions are undergoing. This approach is based on that suggested by Lord et al. (2015), grounded in organizational theory; they integrate quantum theory with a concept of the future as a flow to the present, in what they call a quantum approach to time and change (QATC approach). The application of this approach to organizational and societal issues is quite recent and innovative, and it presents a number of advantages over traditional specification models. Its main feature is that it allows for the possibility of creating multiple future scenarios: in our case, regarding the education model. As the QATC approach in the field of higher education establishes the possibility of multiple future scenarios for the educational model, we present below an illustration that models the relationship between higher education and society.

Modelling the relationship between higher education and society: An illustration

Márquez-Ramos and Mourelle (2016) emphasized that the future is not just a continuation of the past. In fact, the past represents just one of an infinite number of possible outcomes and we should bear in mind that the future may involve a different framework. We are used to basing expectations of future events on past occurrences: it seems reasonable and convenient, mainly for reasons of data availability. For an application to the relationship between web-based (web 1.0) technologies and change in higher education see, for example, Collis and van der Wende (2002).

Nevertheless, it is not just a matter of data or samples; phenomena change and we cannot expect a model based on the past to work perfectly when applied to the future. In this research paper, we provide an analysis of the relationship between higher education and society. More specifically, our illustration considers this relationship as being quantum in nature.

We start by showing in Table 1 how the processing of the selection between two possible types of learning can be represented using the principles and concepts of quantum theory applied to organizational theory (Lord et al., 2015). On the one hand, a potential student i might choose to study at a “local” higher education institution A, which is focused towards traditional teaching. On the other hand, potential student i might also choose to study in B, a highly-esteemed higher education institution that specializes in offering high-quality virtual degrees (i.e., specialized in distance education). It is not easy to predict which decision potential student i will take.

[INSERT TABLE 1]

Regarding the application of the QATC approach, it is worth mentioning the effect of the “principle of interference” when gathering the data required to answer a research question. Educational researchers might want to gather data from individuals to find out about their perceptions of type A or type B organizations. However, if the individual or potential student i becomes aware of the researcher’s presence, this could influence the decision-making process. A promising approach is that from an international university that provides distance education in Spain (exclusively online): Burgos (2017) mentions that a “transgenic” learning might be a required revolution in big data and learning.

Next, we aim to model the relationship between the (transformation of) society and higher education. This specification also helps us to illustrate the fallacies we may fall into when predicting the future of higher education organizations, or of a higher education model, if we do not use an appropriate approach.

In our model, the first equation describes the determinants of higher education and the second equation describes the determinants of societal preferences. In technical terms, this is a framework of simultaneous equations (see, e.g., Wooldridge, 2009). The equation for analyzing the determinants of (the future of) higher education (HE) is:

$$HE = \alpha_1 \text{ Predictable} + \beta \text{ Nonpredictable} + u \quad [1]$$

while the equation that includes the determinants of (the future of) societal changes (SOC) is:

$$SOC = \alpha_2 \text{ Predictable} + u \quad [2]$$

The “Predictable” part of the model consists of those elements of the higher education universe that are assumed to vary to a lesser extent or which change more gradually

over time, as would be the case, for example, with infrastructure or quality indicators. As for the “Nonpredictable” part, this includes the elements which are more difficult to control, as they partially depend on subjective issues; a pertinent example is students’ perceptions of different higher education organizations.

For our illustration, we assume that we can write the determinants of both HE and SOC in a linear functional form and that we can estimate the parameters associated with the predictable and nonpredictable parts of the system, thus obtaining an estimation of the magnitude of the expected change of the dependent variables (higher education and society) when one of the explanatory variables on the right-hand side of the equations changes, either in the predictable or in the nonpredictable part. We denote the prediction error as u .

As observed in equations (1) and (2), we assume that the HE curve has a nonlinear and unobserved shifter, denoted as “Nonpredictable”, as well as a linear and observed part, labeled “Predictable”. However, the determinants of the societal changes are assumed to be predictable and so SOC has no shifter. Although this is a very strong assumption (that there is not a nonpredictable/nonlinear part in equation 2), it makes some sense to assume that the current space-time model that includes virtuality and “timeless time”—though it might expand or contract—will be the one that exists in the future. Therefore, HE is the identified equation in the system.

As for illustrating this framework, we suggest a graph where we identify four different quadrants representing the combination of communication types that might predominate in the future, virtual or face-to-face, and the type of learning provided by two categories of higher education institutions. In our example, institution A represents a “local” institution that relies on traditional forms of education (usually close to student i’s home); conversely, institution B represents a highly-esteemed educational organization,

which provides high-quality distance education, oriented towards large audiences and exploiting the potential of “timeless time”.

Data points trace the societal curve. Thus, the society equation could be estimated, under the abovementioned assumptions, in a linear framework (see figure 1). Point 1 denotes that changes in the predictable and the nonpredictable part of the higher education equation, as well as changes in the predictable part of the society equation, concern a future scenario where there is a preference for studying in institution A (traditional learning) and in which the predominant form of communication is virtual. Point 2 and point 3 are located in Quadrants II and IV, respectively. In Quadrant II the scenario is one of a predominantly virtual form of communication, and a preference for studying in B (virtual learning). Finally, Quadrant IV represents a scenario where face-to-face communication predominates, but where there is a preference for studying by means of virtual learning (in B).

[INSERT FIGURE 1]

As we can see in equation (1), there is a nonlinear/nonpredictable part on the right-hand side of the equation, so the prediction of the scenarios regarding higher education is nonlinear. Figure 2 shows these nonlinearities that illustrate how difficult it is to predict the “equilibrium” points, i.e. where the SOC and the HE curves intersect and the proposed future scenarios are located. What seems clear is that the potential for a more open, distance-based and flexible education, where learners are not constrained by the time and place of study, should not be overlooked.

[INSERT FIGURE 2]

Conclusions

In a world dominated and guided by information and communication technologies, we can observe how these emergent technologies transform our society. For example, we have such unlimited access to information that it can become somehow beyond our control.

It has been widely noted that higher education and society continuously interact, prompting changes in many aspects. One particular consequence concerns the challenge that the current, so-called network society poses to educational practices. In fact, students are already displaying new needs and expectations. But is technology-based learning really the most appropriate and effective way for students to learn?

Current and future learning environments involve both physical and virtual scenarios; ICTs mean that the teaching-learning process is bounded neither by time nor by location. A remarkable growth in technology-based educational practices is accompanying the traditional educational model. Two crucial questions then arise: what will the higher education model look like in the future? And what changes will we see over time in students, the teaching-learning process and higher education organizations? We develop a quantum-based model with the aim of modelling the relationship between higher education and (the transformation of) society; it allows us to consider multiple future scenarios for the education model. What is clear in any potential context is that higher education organizations must meet the demands of society, especially regarding the development of competencies, given the great value of lifelong learning. In addition, the future model should not lose sight of the main objectives in education: to achieve more effective learning and better learning outcomes.

The current research reveals the complexity of such an analysis, and as such it represents a challenge. At the same time, it may help to reflect on what higher education

organizations are doing at present and what they want for the future in light of changing societal conditions and in order to best serve the members of society that will shape higher education in the future: the students.

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APPENDIX: TABLES AND FIGURES

TABLE 1. Quantum entity and terminology for the process of potential student *i* selecting a higher education organization.

Organizational entity	Quantum terminology
Representation of phenomena	
A state in which a learner <i>i</i> has not yet chosen a higher education institution to study (type A or B)	Superpotentiality state
High exposition to virtual learning in B	Basis vector
Representation of the processing of the selection of higher education institution	
Possibility of accessing a higher education institution A, which is local, along with the possibility of accessing a higher education institution B, which is virtual and highly-esteemed	Incompatibility of choosing both higher education institutions A and B
Higher education institution A provides an opportunity for student <i>i</i> to study in A	Collapse of superpotentiality state, creating probabilities for learners to study in higher education institution A
Representation of selection process (to study in A or in B?)	
Perceived advantages of studying in B are highly dissimilar for future and previous generations of learners (we can control for individual characteristics, but perceptions about B have changed with regard to perceptions held by previous generations of students– increase in accessibility)	Alternative schemas are incompatible
Perceived advantages of studying in A might present similarities between today’s learners and previous generations of learners (common location, background/local higher education institutions engaged with local development)	Alternative schemas are compatible

FIGURE 1

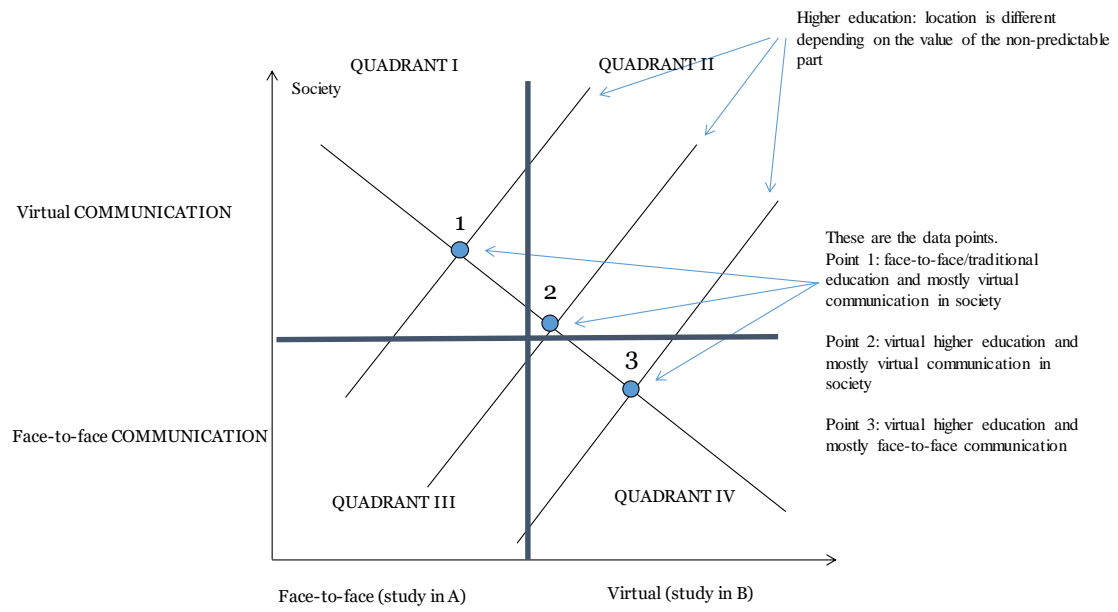


FIGURE 2

