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THE DIFFUSIONIST- EVOLUTIONIST MODEL OF E-LEARNING DEVELOPMENT

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Introduction

During the past decade, several authors have applied Rogers's theory of diffusion of innovations to the development of e-learning (Rogers, 1995; Zemsky & Massy, 2004; Elgort, 2005; Duan et al, 2010; Zhang et al, 2010; Soffer, Nachmias, & Ram, 2010; Jandric, 2012). The diffusionist model of e-learning development is instrumental in describing small-scale and time restricted phenomena such as implementation of e-learning to educational institutions. Although the diffusionist model theoretically does not allow predictions, it helps creating accurate small-scale educated guesses. For this reason, the diffusionist model achieves reasonable success in small-scale practical studies of e-learning development (Jandric, 2012).

However, accuracy of the diffusionist model decreases in inverse proportion to research scale (Rogers, 1995). In order to provide deeper insight into large-scale phenomena, this study develops an evolutionist approach to e-learning development and analyzes its main theoretical and practical consequences. Based on the heated debate about relevance of evolutionism in the context of social science, it does not claim that education really evolves into e-learning. Instead, it only asserts that the evolutionist model can be used as one of the descriptions of e-learning development.

This study attempts to explore the relationship between the diffusionist and the evolutionist model of e-learning develop-

Abstract. *This paper explores development of the discipline of e-learning. It develops the evolutionist model of e-learning development and compares it with the diffusionist model of e-learning development. Using transdisciplinary research methodology, it develops the diffusionist-evolutionist model of e-learning development. The diffusionist aspect of the model concentrates to practical issues such as introducing e-learning into educational institutions. The evolutionist aspect of the model concentrates to theoretical issues such as comparative studies of historical developments. On such basis, the diffusionist-evolutionist model provides a single practical framework for describing small-scale and large-scale e-learning development. Following methodological restrictions, the diffusionist-evolutionist model does not reflect any natural principle. As a research principle, it only aims at improving our current descriptions of e-learning development.*

Key words: *diffusion of innovations, diffusionism, e-learning development, evolutionism, transdisciplinary research.*

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ment in two consecutive steps. The first, phenomenological attempt in comparing the diffusionist and the evolutionist model of e-learning development indicates their complementarity. The second attempt reaches beyond phenomenology and seeks inspiration in establishing analogy with an existing, well-researched pair of models. In order to examine whether it is possible to establish an analogy between models based on different theoretical frameworks, it explores transdisciplinary research methodology.

Having established safe theoretical background, this study draws analogy between mutual relationship of the diffusionist and the evolutionist models of e-learning development and mutual relationships of the wave and the particle models of behaviour of elementary particles. In order to provide theoretical and practical consistency of the research, this analogy is established at an abstract level provided by generic characteristics of modelling and governed by logic. On such basis, the study finally develops the diffusionist-evolutionist model of e-learning development and examines its main theoretical and practical restrictions.

The Evolutionist Model of E-Learning Development

There are two main prerequisites for applying evolutionist theory to e-learning development: e-learning should be the next evolutionary step in education development, and evolutionist theory should be suitable for application to problems in social science.

Levi-Strauss's Proof of Evolution

Let us first explore the hypothesis that e-learning is the next evolutionary step in education development. According to Levi-Strauss,

[f]or such a hypothesis to be legitimate we should have to be able to prove that one type is more primitive than the other; that the more primitive type evolves necessarily toward the other form; and, finally, that this law operates more rigorously in the centre of the region than at its periphery (1963: 7).

In order to apply Levi-Strauss's proof, one should first define criteria for primitivity. Contemporary approaches to culture can be generally divided into materialist-oriented approaches and meaning-oriented approaches.

"The materialist approaches all share the assumption that material forces drive the cultural system, and that to understand both cultural diversity and the dynamics of culture it is necessary to look to the underlying material conditions" (Hatch, 1973). Technology is one of the basic material conditions. Despite numerous technological advances, traditional education has been using essentially the same technology for millennia. In Aristotle's peripatetic school students walked and discussed while their teacher, exactly as described in the famous story of Archimedes and his circles, occasionally depicted his thoughts on dusty ground using his walking stick (Ackrill, 1981). This educational technology is still mirrored in most educational establishments: chalk is merely dust gathered in a stick, while blackboard is coarse surface just like ground. Following this line of reasoning, the development of educational technologies through several millennia can be reduced to mere switch from positive to negative.

However, the advent of information and communication technologies introduced significant changes in educational practise: real-time collaboration at a distance, the opportunity to access the unseen amounts of information within few clicks, etc. Those changes are both quantitative and qualitative (Levinson, 1999; van Dijk, 1999; Castells, 2003). From the materialist perspective, therefore, traditional education is definitely more primitive than e-learning.

As opposed to materialist approaches, the meaning-oriented approaches take an interpretive position.

The meaning-oriented approaches to culture take as a central principle that human beings bestow meaning on the world of experience. The world is said to be culturally constructed, by which is meant that



phenomena are classified and ordered, valued, given significance, made salient, and the like, by means of cultural frames of reference. By this view, it is essential that the researcher focus on the systems of meaning of a society, for people are oriented in their everyday lives by their cultural frames of reference (Hatch, 1973).

Education is the basic human need in any society. However, cultural frames of reference created by one-way communication technologies of the massive society such as television and radio are radically different from cultural frames of reference created by two-way information and communication technologies (Levinson, 1999; van Dijk, 1999; Castells, 2003). Within the conceptual framework of meaning-oriented approaches education in the massive society is conceptually equivalent, albeit very different, from education in the network society. In this way, the meaning-oriented approaches provide theoretical argument in favour of the conclusion that traditional education is more primitive than e-learning. Using Bourdieu's (2007) and van Dijk's (1999) terminology, e-learning is education imbued into habitus of the network society.

Such conclusion, however, still does not imply that traditional education evolves to e-learning. The analytical argument in favour of necessity of evolution can be found within the critical recognition of the dialectical relationship between education and society (Freire, 1972; Carr & Kemmis, 1986). It is common knowledge that our society evolves from massive society to the network society (Castells, 2000; van Dijk, 1999). With an important theoretical constraint – rejection of the primitivist predictions that humankind will soon abandon information and communication technologies (Zerzan, 2004; Baudrillard, 1996) – traditional education really evolves towards e-learning.

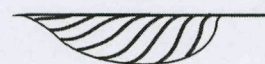
Finally, according to the last Levi-Strauss's postulate, traditional education should evolve more rigorously in the centre of the region than at its periphery. Global statistics display direct correlation between country GDP and penetration of information and communication technologies (Internetworldstats, 2012). With minor statistical deviations, e-learning adoption closely follows adoption of information and communication technologies (Zemsky & Massy, 2004). Following Levi-Strauss's postulates (Levi-Strauss, 1989: 17), this correspondence finally confirms that e-learning is the next evolutionary step in the development of education.

Evolutionist Theory and Social Science

The second prerequisite for applying evolutionist theory to e-learning development is to confirm that evolutionist theory is suitable for application to problems in social science. In absolute terms, however, such proof is impossible to obtain. Although "the theory of evolution is accepted by nearly the entire scientific community", scientists are still deeply divided when it comes to applying evolutionism in social science (Encyclopædia Britannica, 2012a). One of the most prominent hot potatoes in this field is Dawkins's sociobiology, which applies evolutionism in order to explain social behaviour (1989). Although the majority of scientific community rejects radical evolutionism (Grafen & Ridley, 2006), there is an emerging scientific movement towards reconciliation of the rival theories. In this context, Turner and Maryanski conclude that

[t]here are now real prospects for evolutionary thinking from biology to be re-incorporated into sociology, as Comte had predicted, but before this re-incorporation can go very far, some serious analytical work is necessary. It is valuable to use ideas from biology in sociological analysis, but at the same time, it is also important to recognize that there are limits to this application of evolutionary models (2008: 4).

The discussion about relevance of evolutionism in social science reaches much deeper than the extent of this paper and/or the ability of its author. For this reason, following Turner and Maryanski's warning, this paper accepts evolutionism only as a model for describing the reality. On such basis, it does not claim that education really evolves into e-learning – instead, it merely asserts that the evolutionist model can be safely used as a phenomenological description of education development. The question whether e-learning really evolves, therefore, remains open for more able researchers.



The Relationships between the Diffusionist and the Evolutionist Model

The First Attempt: Phenomenology

The continuous nature of the evolutionist model resolves some important theoretical drawbacks of the diffusionist model such as the discrete division between traditional education and e-learning. It removes some simplifications built in the diffusionist model such as categorisation of population into distinct categories, and the inability to recognize technological advances and disruptive technologies. However, following Turner and Maryanski's warning, the evolutionist model is as phenomenological as the diffusionist one: therefore, both models are unable to provide predictions (ibid).

The evolutionist model says very little about stages of e-learning development. However, its theoretical consistency is suitable for describing long periods of time and whole disciplines i.e. large-scale research. The diffusionist model is instrumental in describing small-scale and time-restricted phenomena such as implementation of e-learning to educational institutions. However, the in-built theoretical inconsistencies decrease its accuracy in inverse proportion with research scale (Jandric, 2012). Each model provides results that cannot be achieved within the framework of its counterpart. Moving away from its native domain, each model proportionally loses accuracy and finally becomes obsolete. On phenomenological basis, therefore, the diffusionist and the evolutionist models of e-learning development can be considered complementary. In order to explore this relationship deeper, however, it would be useful to establish an analogy with an existing (and preferably well-researched) theory.

The Second Attempt: The Quest for Analogy

Phenomenological models are fairly widespread in social science. However, simultaneous descriptions of the reality with two complementary models are fairly unusual (Carr & Kemmis, 1986). In order to explore the relationship between the diffusionist and the evolutionist model of e-learning development, we shall therefore seek guidance in natural science. In quantum physics, behaviour of elementary particles is described by the wave-particle model. In short, the wave-particle model implies that the undisturbed elementary particles simultaneously behave as waves and as particles. The wave model describes one physical reality, while the particle model describes another physical reality. The wave model and the particle model are incommensurable, because they explore various realities of physical phenomena. For this reason, the decision whether to use the wave model or the particle model strongly depends on the context of the researched physical reality. The wave model and the particle model are complementary, because their results fit together into a larger scheme called the wave-particle model (Feynman, Leighton and Sands, 1998).

The relationship between the diffusionist and the evolutionist models of e-learning development strongly resembles the relationship between the wave and the particle model in quantum physics. The first pair of models is almost completely unexplored, while the latter has been researched in detail for more than half a century. For this reason, the following discussion will establish an analogy between the two pairs of models. Before getting on to work, however, this study shall briefly explore scientific validity of such enterprise.

Towards a Transdisciplinary Research Methodology

In order to examine whether it is possible to compare models based on different theoretical frameworks, this study shall briefly look into the recent example of Sokal's hoax. In 2006 Sokal published a hoax article in academic journal of postmodern cultural studies called *Social Text*. Drawing the analogy between social science and physics, Sokal concluded (and editors accepted) that „physical reality (...) is at bottom a social and linguistic construct“. On such basis, Sokal 'proved' that quantum gravity is socially and linguistically constructed (Sokal, 1996a). Few months later Sokal revealed details about his hoax in another journal, somewhat bitterly stating that "anyone who believes that the laws of physics are mere



social conventions is invited to try transgressing those conventions from the window of my apartment. (I live on the twenty-first floor.)" (Sokal, 1996b: 2). Sokal did his hoax on purpose. However, the fact that editors of the renowned journal accepted his conclusions shows that flawed argument arising from analogies between social and natural science is sometimes difficult to identify.

In order to avoid falling into a similar conceptual trap this study shall turn to theories of transdisciplinarity. According to Nicolescu, any transdisciplinary research will inevitably fail if it simultaneously uses concepts developed within different conceptual frameworks: social phenomena may really be constructed, but gravity is one of the basic properties of the physical world. However, it is possible to find a more abstract level of understanding where differences between conceptual frameworks disappear and thus enable sound reasoning (Nicolescu, 2006).

Such level of comparison is enabled by modelling. Models are abstract creations: the evolutionist model of e-learning does not imply that traditional education really evolves to e-learning, and the wave model does not imply that elementary particles are waves. Model consistency is ensured by logic: in various contexts, the diffusionist model and the particle model utilise Gaussian distribution according to strict mathematical rules. Viewed as abstract and logical creations, models can be compared (and analogies can be drawn) on the theoretical level that avoids problems which arise from using concepts developed within different conceptual frameworks. Upon returning to initial conceptual frameworks, the found conclusions should be properly interpreted. Such reasoning is sound for as long as models are interpreted instrumentally, i.e. for as long as models are not given deeper than phenomenological meanings (*ibid.*).

Nicolescu's approach to transdisciplinarity is consistent with the previous research results such as the inability of the diffusionist and the evolutionist models to provide predictions. For this reason, it provides safe theoretical background for establishing an analogy between the diffusionist and the evolutionist models of e-learning development and the wave and the particle models in quantum physics.

The Diffusionist-Evolutionist model of E-Learning Development

In quantum physics, the relationship between wave and particle models is described by Heisenberg's uncertainty principle:

Every particle has a wave associated with it; each particle actually exhibits wavelike behaviour. The particle is most likely to be found in those places where the undulations of the wave are greatest, or most intense. The more intense the undulations of the associated wave become, however, the more ill defined becomes the wavelength, which in turn determines the momentum of the particle. So a strictly localized wave has an indeterminate wavelength; its associated particle, while having a definite position, has no certain velocity. A particle wave having a well-defined wavelength, on the other hand, is spread out; the associated particle, while having a rather precise velocity, may be almost anywhere (Encyclopædia Britannica, 2012b).

Let us try to paraphrase Heisenberg's uncertainty principle in the context of the diffusionist and the evolutionist model of e-learning development. Education simultaneously diffuses and evolves; each time that e-learning diffuses into an institution, the whole discipline of education evolves. The diffusionist properties are most likely to be found in small-scale research, while the evolutionist properties are most likely to be found in large-scale research. The more intense the diffusionist properties, however, the more ill defined become the evolutionist properties and vice versa. So a strictly localised educational research has fully determinate diffusionist and indeterminate evolutionist properties, while a historic evolutionist research has fully determinate evolutionist and indeterminate diffusionist properties. Such relationship between model properties and research scale of the diffusionist and the evolutionist model of e-learning development is shown in Figure 1.



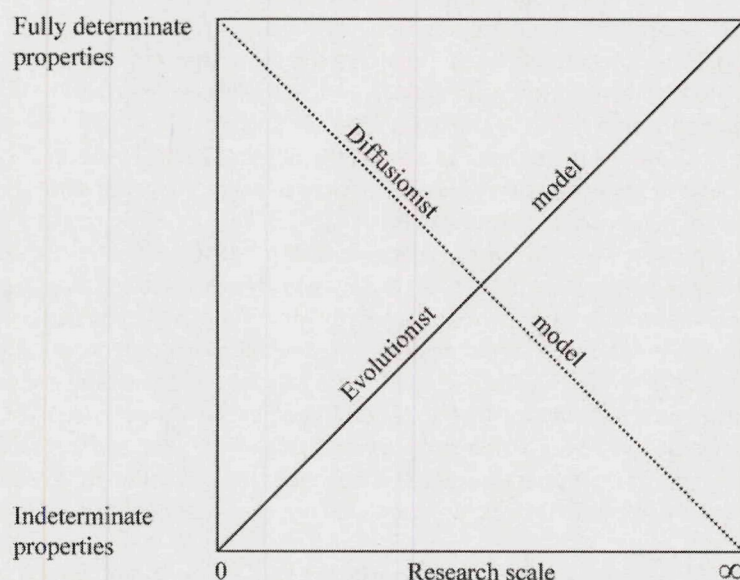


Figure 1: The diffusionist and the evolutionist model of e-learning development: model properties vs. research scale.

The diffusionist and the evolutionist model of e-learning development depart from opposed theoretical assumptions. For instance, the diffusionist model is based on discrete approach to e-learning development while the evolutionist model is based on continuous approach. For this reason, they are incommensurable: applying each model implies creating a distinct, unique reality. On the other hand, the diffusionist and evolutionist model are complementary because their descriptions of different realities fit into a larger unified scheme. The dual approach to modelling reality has significantly contributed to our understanding of the physical world. On such basis, it is worthwhile to try and see what it might offer to education research.

Inspired by the wave-particle model of quantum-mechanical behaviour, we shall name our model *the diffusionist-evolutionist model of e-learning development*. The diffusionist aspect of the model concentrates to mechanics of educational process and dominates small-scale research; in this context, it stands for educational practice. The evolutionist aspect of the model concentrates to the society and dominates large-scale research; in this context, it stands for educational theory.

All research scales simultaneously include theory and practice. Extremely small-scale educational research that includes only one person, fully stands for educational practice, and belongs to the field of human psychology, still involves theory. Extremely large-scale educational research, that includes whole historic periods, fully stands for educational theory, and belongs to the field of history, is still used to inform practice. In the diffusionist-evolutionist model of e-learning development the evolutionary theory does not precede the diffusionist practice and the diffusionist practice does not precede the evolutionary theory. In this way, the diffusionist-evolutionist model of e-learning development arrives to the commonly accepted view to education as praxis (Carr & Kemmis, 1986: 34).



Discussion

Research Validity

In order to examine validity of this research it is necessary to look into the theoretical basis of transdisciplinary research methodology. According to Nicolescu, methodology of transdisciplinarity consists of the following axioms:

- i. The ontological axiom: There are different levels of Reality of the Object and, correspondingly, different levels of Reality of the Subject.
- ii. The logical axiom: The passage from one level of Reality to another is insured by the logic of the included middle.
- iii. The epistemological axiom: The structure of the totality of levels of Reality appears, in our knowledge of nature, of society and of individual human beings, as a complex structure: every level is what it is because all the levels exist at the same time (Nicolescu, 2006).

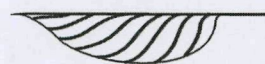
The ontological axiom is known at least since Heraclitus: "You could not step twice into the same river; for other waters are ever flowing on to you" (in Hoyt, 2002). In order to keep an eye on the subject, we might add that you could not step twice into the same river also because the second time you would not be the same person as the first time. The development from cultural frames of reference created by one-way communication technologies of the massive society such as television and radio to cultural frames of reference created by two-way information and communication technologies creates numerous realities associated with each singularity in space-time continuum. Therefore, development processes between each pair of realities are described by incommensurable and complementary diffusionist and evolutionist models that create two levels of reality of the object and two levels of reality of the subject.

The logic of the included middle implies that, when studies of a phenomenon in two different realities are incommensurable, there is a third result, which exists on the third level of reality, which unifies the incommensurable results and relieves the apparent contradictions. In short "it is the included middle logic which allows us to jump from one level of Reality to another level of Reality" (Nicolescu, 2006). Departing from contradictory theoretical assumptions, the diffusionist and the evolutionist models of e-learning development are incommensurable. For instance, the discrete shift between stages of the diffusionist model cannot be described using the continuous evolutionist approach and vice versa. Using the logic of the included middle, however, the diffusionist-evolutionist model of e-learning development creates an abstract, logic-based third reality which transforms tensions between the confronting realities associated with the diffusionist and the evolutionist model into complementarity. The existence of the logic of the included middle between the diffusionist and the evolutionist model implies that the diffusionist evolutionist model of e-learning development corresponds to the logical axiom of transdisciplinarity.

Finally, the epistemological axiom claims that "the structure of the totality of levels of Reality is complex", i.e. that "every level is what it is because all the levels exist at the same time" (ibid). The proof for epistemological axiom in the context of education is trivial: all education is deeply rooted in context, and the context of each educational situation is unique. Therefore, the diffusionist-evolutionist model of e-learning development corresponds to the epistemological axiom.

Model Consistency

The correspondence of the diffusionist-evolutionist model of e-learning development with Nicolescu's axioms proves that the model is properly developed within transdisciplinary research framework. However, such proof says little about theoretical consistency of the model: the answer to this question lies within the recent and largely unmapped field of epistemology of transdisciplinarity. In order to introduce the problem, Janz summarizes arguments in favour of transdisciplinarity:



Our modern history of specialization in the pursuit of knowledge has brought precision, but at the cost of insularity. It has given progress, but this progress is ultimately defeated by the limitations of its own method. And, the pursuit of knowledge without any sense of moral direction has led to perversions of progress and excessive abstraction from reality itself (...) (Janz, 1998: 4).

At practical levels, such as applications of the diffusionist-evolutionist model of e-learning development to policy making, transdisciplinarity provides solutions for the aforementioned problems. However, Janz asserts that the practical approach does not reach deeper than surface. According to Janz disciplinary cooperation cannot be achieved without an intellectual framework, or through mining the resources of other disciplines, or by establishing an over-arching 'meta-discipline'. "What is needed is a way of preserving the particularity of disciplinary knowledge, while at the same time finding the underlying rationality. Both the infinite and the finite (to use Kierkegaard's terminology) must be preserved to have knowledge that is truly human" (ibid). The diffusionist-evolutionist model of e-learning development keeps particular knowledge arising from both approaches. It also preserves the infinite: for instance, it recognizes that all education is praxis. For this reason, the diffusionist-evolutionist model of e-learning development well corresponds to Janz's critique of transdisciplinarity.

Reach and Scope of the Model

Mittelstraß asserts that fields and disciplines "came into being in the course of the history of the sciences, and that their borders are founded primarily neither in objects nor in theory, but that they are historical as well" (2000). Actually, the majority of traditional academic disciplines address problems that cannot be reduced to a single disciplinary frame: in this sense, traditional disciplines already imply some kind of transdisciplinarity. For instance, heat was first described by internal motion of particles and therefore 'belonged' to physics. With the advent of caloric theory it was described as some kind of matter and therefore studied within the field of chemistry. With the advent of kinetic theory, studies of heat returned to the field of physics. "This shows that it is not the objects (alone) which define a discipline, but the manner in which one deals with them theoretically" (ibid).

This can be clearly shown using the comparison between positivist and critical views to education. The positivist view to education research is based on strict theoretical framework that does not require crossing disciplinary borders. As opposed to positivism, critical education is concerned with dialectical relationships between technologies, pedagogies and social studies (Carr & Kemmis, 1986: 34): consequently, it inherently needs transdisciplinarity. Transdisciplinarity is not innate to all education studies: it is the sole consequence of specific research assumptions. On such basis Mittelstraß postulates the four main characteristics of transdisciplinarity:

1. Transdisciplinarity is an integrating, although not a holistic concept. It resolves isolation on a higher methodological plane, but it does not attempt to construct a "unified" interpretative or explanatory matrix.
2. Transdisciplinarity removes impasses within the historical constitution of fields and disciplines, when and where the latter have either forgotten their historical memory, or lost their problem-solving power because of excessive speculation. For just these reasons, transdisciplinarity cannot replace the fields and disciplines.
3. Transdisciplinarity is a principle of scientific work and organization that reaches out beyond individual fields and disciplines for solutions, but it is no trans-scientific principle.
4. Transdisciplinarity is above all a research principle, (...) and only secondarily, if at all, a theoretical principle, in the case that theories also follow transdisciplinary research forms (Mittelstraß, 2000).

The transdisciplinary diffusionist-evolutionist model of e-learning development integrates the diffusionist and the evolutionist model; however, it does not attempt to construct a unified interpretative



or explanatory matrix. The diffusionist and the evolutionist model remain incommensurable, while their complementarity leaves room for various interpretations. "Conceiving of transdisciplinarity as a new form of holism would mean that one was concerned here with a scientific principle, that is to say a scientific orientation, in which problems could be solved in their entirety" (ibid). As can easily be seen from our interpretation of the diffusionist-evolutionist model of e-learning development, transdisciplinarity does provide results that cannot be reached by disciplinary approach (es). However, modelling is only tip of the research iceberg: deeper explanations should be sought within epistemology of transdisciplinarity, educational theory, anthropology and other traditional disciplines.

The diffusionist-evolutionist model of e-learning development provides a single practical framework for describing small-scale and large-scale e-learning development. In this context, it fills the important theoretical gap in contemporary studies of e-learning. However, it stands on two important pillars – the diffusionist and the evolutionist theory – and does not offer a third, unique approach. The role of the diffusionist-evolutionist model of e-learning development lays solely in unifying the disciplinary approaches into a wider system of meaning. Therefore, it does not offer a trans-scientific principle: as a research principle, the diffusionist-evolutionist model of e-learning development is just a description of the reality that cannot be described solely within the diffusionist or the evolutionist models.

Conclusions

This study applies evolutionist theory to e-learning development. Based on Levi-Strauss's proof of evolution and the uncertain outcome of the debate about relevance of evolutionism in social science, it asserts that the evolutionist model can be safely used as a phenomenological description of education development. It explores the relationships between the diffusionist and the evolutionist model. At phenomenological level, it shows that the models are complementary. In order to explore this relationship further, it seeks analogy with an existing, well researched theory and finds it in the wave-particle model of behaviour of elementary particles. In order to examine theoretical validity of the analogy, it turns to transdisciplinary research methodology and finds safe theoretical background at the abstract level of modelling. On such basis, this study develops the diffusionist-evolutionist model of e-learning development and examines its validity, consistency, reach and scope.

The evolutionist aspect of the model enriches small-scale descriptions derived from the diffusionist aspect of the model with large-scale, long-term visions of e-learning development. The evolutionist aspect of the model is unable to provide firm answers to problems here and now: however, it may provide vision and inspiration for innovation, a certain *je ne sais quoi* which, according to late Steve Jobs, "distinguishes between a leader and a follower" (Encyclopædia Britannica, 2012c). On the other side of the spectrum, the diffusionist aspect of the model provides an important practical anchor for wide evolutionist brush-work which covers large geographic, cultural and temporal scales. Making innovations happen requires a lot of work. E-learning has not entered all aspects of contemporary educational systems only because of few visionaries. On the contrary, it is predominantly based on effort provided by numerous teachers who have created educational material and published it, often free of charge, into various online libraries and repositories.

In order to develop new educational concepts and introduce them into their environments, people need large-scale understanding which governs long-term actions provided by the evolutionist aspect of the model and small-scale understanding which governs their everyday work provided by the diffusionist aspect of the model. Depending on context, research focus will often be biased towards one aspect of the diffusionist-evolutionist model of e-learning development. For instance, a university body which develops a ten year strategic plan will probably focus to the evolutionist aspect of the model, while a learning technologist who introduces a specific e-learning technology here and now will probably be more interested in the diffusionist aspect of the model. However, only a useless strategic body would ignore the current reality, and only a hopeless learning technologist would introduce new technologies without any vision of the future. The diffusionist and the evolutionist aspects of the model do not merely inform each other: they are dialectically intertwined, and therefore equally important for all levels of educational praxis.



The diffusionist-evolutionist model of e-learning development possesses significant potentials to broaden our insight into the complex relationships between society, education and information and communication technologies. Based on inherently incommensurable nature of the diffusionist and the evolutionist model, however, those potentials strongly depend on the logic of the included middle which, by definition, depends on individual interpretation. Rather than providing complete answers, therefore, the diffusionist-evolutionist model of e-learning development creates a specific research framework which offers countless opportunities for development. The diffusionist-evolutionist model of e-learning development does not reflect any natural principle. As a research principle, it is limited to providing a phenomenological description of education development. The answers to big questions, therefore, should be sought beyond modelling.

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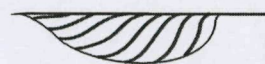
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