Research methods are made by questioning: the postdisciplinary challenge of networked learning

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Abstract

This paper describes development of networked learning using Fraser's powerful analogy between human migration and scientific research. It recognises that most contributions to the field are developed in diverse and often mutually incommensurable research traditions from education to engineering, and identifies dialogue across different conceptual frameworks as the main challenge in their interpretation. It explores the rise of disciplinarity, and exposes its dialectical relationships with education and class. Based on wide body of research developed by members of Frankfurt School of Social Science and their successors, it analyses the relationships between technologies, society and human beings and asserts that the rise of technoscience is dialectically intertwined with the rise of disciplinarity. Moving on to the present, the paper shows that exponential rise in complexity of our tools, characteristic for the network society, has transformed disciplinarity into the new normality. During the process, it has reinforced the existing power relationships and supported further social stratification. In the network society, disciplinarity bears exactly the same consequences as in earlier historic periods. However, the stakes are much higher. Contemporary disciplinarity has significantly reduced blue-skies research to applied research, caused rapid commodification of education, and actively contributed to various environmental crises. On such basis, the paper proposes that networked learning should be analysed beyond traditional disciplinarity. It acknowledges epistemological consequences of such fundamental changes in scientific understanding of the world, and evokes a new postdisciplinary intellectual universe based on the ruins of traditional disciplinary structures. Finally, the paper briefly outlines the main postdisciplinary approaches: multidisciplinarity, interdisciplinarity, transdisciplinarity and antidisciplinarity. It warns that the outlined approaches are currently still in flux, briefly analyses their mutual relationships, and links them to issues pertaining to networked learning. On such basis, the paper proposes that postdisciplinary approaches might transcend methodological restrictions inherent to disciplinary research methodologies and provide the field of networked learning with a unified explanatory framework. Recognising that validity and verifiability of our research methods are still grounded in various disciplinary frameworks, it concludes that there is a long way from this modest proposal to its full realisation and calls for further investigation of postdisciplinary research methods for networked learning.

Keywords

Networked learning, research methods, critical theory, postdisciplinarity

Introduction

As I day-dreamed at a messy academic desk, my wandering glance was accidentally caught by a poetic title peaking from the nearest pile of papers: "Pioneers have no maps, but they do inherit tools" (Fraser, 1992). I immediately pictured my pot-bellied academic self in cowboy clothes, venturing into pastures new and unexplored, on the back of my faithful horse, armed with good old lasso and pick-axe. Whilst it would be extremely vain to call my research efforts pioneering, this funny image immediately stroke as a powerful metaphor for networked learning. On this basis, I decided that Fraser's timeless analogy between scientific research and human migration sets exactly the right tone and spirit for this article. In his 2001 acceptance speech for 'The Founders Award of The American Society of Composers, Authors, and Publishers', legendary singer and poet Tom Waits has succinctly summed up the complete history of human migration in two simple sentences. “When people migrate, they take their seeds and their songs. (...) Essentially, that is pretty much all you need when you get there“ (2001). In my free interpretation, Waits's assertion consists of two components. Seeds represent the unique features of being human and the totality of human experience of the world:

neglecting finer theoretical subtleties, they are the metaphor of Arendt's human condition (1998). Songs represent our understanding of the world: they equally consist of scientific knowledge, myth and custom.

Waits's description refers to times when first settlers arrived to unexplored physical and cultural spaces of 'the American Wild West', and their only connection with 'the Old World' had literally been contained in their minds and suitcases. However, the world of Buffalo Bill, Butch Cassidy, Pat Garrett and Wyatt Earp is long gone. In our contemporary world where all species have been documented, all countries have been cartographed, and where "the Answer to the Ultimate Question of Life, the Universe, and Everything" (Adams, 1995) is sought by the enormous electricity guzzler that goes by the lovely name of 'Large Hadron Collider', there is no physical escape from the global technological and social reality. Certainly, one can always try. For instance, it is easier than ever to pack a bunch of guns and tools, fly across the globe, and settle into one of the few remaining isles of wilderness such as the Amazon. In the post-McLuhanist global village, however, the ability to survive independently of civilisation does not imply independence from civilisation. Sooner or later, activities of our fearless hunter and fruit gatherer will inevitably show up on 'Google Earth' or some other tool designed to inform and amuse. It is easy to picture a shiny banner at the central position of your favourite news portal: Exclusive! Professor of e-learning turned into savage! Extra! Interviews with his wife and children!

In order to adapt Waits's metaphor to the context of contemporary education, one obviously requires more than seeds and songs. Therefore, I shall immerse them into a ubiquitous mist that represents the network society. Mist is a cloud of tiny water droplets suspended in air: seeds require water in order to grow, and people require air in order to sing. Based on dialectical relationships between the eternal and the contemporary, the general and the particular, Waits's metaphor finally brings this research to "learning in which information and communication technology is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources" (Goodyear, Banks, Hodgson and McConnel, 2004: 1) - or networked learning. Firmly situated in the conceptual framework of critical theory, this study is based on the belief (succinctly formulated in Richard Shaull’s famous introduction to Paulo Freire's 'Pedagogy of the oppressed') that human ontological vocation “is to be a Subject who acts upon and transforms his world, and in so doing moves toward ever new possibilities of fuller and richer life individually and collectively“ (2000: 29). Therefore, the metaphor of migration corresponds to the field of networked learning in two main ways. First, it consists of theoretical and practical inquiry into educational issues in the age of the network. Second, it represents active efforts towards their improvement or the journey to a more just society.

Methodological issues in networked learning

In the preface to the newest edition in the important Springer's 'Book Series on Research in Networked Learning', editors analyse key achievements in the field and recognize that the "wide range of theoretical positions and different aims for conducting Networked Learning research is followed by a set of different methodological approaches" (Hodgson, de Laat, McConnell & Ryberg, 2014). Such diversity of contributions is far from accidental. Recently, Damir Boras and I linked the three key areas concerning networked learning – technology, pedagogy and social science - with Habermas’s three main spheres of human interests - the technical, the practical, and the emancipatory (Jandrić & Boras, 2012). Last summer, I was happy to learn that similar links have been drawn in other fields. In his keynote speech at the '3rd International Conference on Critical Education' in Ankara (2013), dear friend Kostas Skordoulis presented a similar argument in the context of science education. Methodological diversity might be one of the main strengths of networked learning, because it equips us with various powerful tools for developing our understanding of the world. However, establishing dialogues across diverse conceptual frameworks and research traditions also represents one of the biggest challenges of contemporary science. How should we interpret and / or compare research results arriving from various disciplines? How can we combine those results in order to enrich our understanding of networked learning?

The rise of disciplinarity

In order to answer these questions, let us try and seek inspiration in the cradles of Western civilisation: ancient Greece and Rome. Before lunch, Archimedes of Syracuse investigated the quadrature of the parabola. After lunch, he explored the ways to efficiently elevate water up the hill. In the evening, he counted the grains of sand that will fit inside the universe. In times of trouble, he developed war machines... (Pickover, 2008) At his day, Archimedes was hardly an exception. Ancient philosophers did not maintain rigid boarders between disciplines. Instead, they studied anything they found important and challenging. Certainly, this does not imply that

everybody did everything: 'Archimedes the Engineer' is best known for his war machines, while 'Aristotle the Natural Philosopher' is mostly remembered as one of the founding fathers of Western thought. Just like nowadays, ancient Greek city-states had carpenters, doctors, soldiers and peasants. However, distinctions between various occupations had been practical rather than theoretical: strictly speaking, ancient Greeks had never developed the concept of narrowing people's expertise into firm disciplinary frameworks (Stiegler, 1998). Perhaps, they simply did not need distinct disciplines: the humankind was young, and its knowledge was still manageable within a single lifetime. Unsurprisingly, such views to human knowledge had directly mirrored to education.

In 'De Oratore', Cicero lists typical subjects taught in Roman schools: "in music, numbers, sounds, and measures; in geometry, lines, figures, spaces, magnitudes; in astronomy, the revolution of the heavens, the rising, setting, and other motions of the stars; in grammar, the peculiar tone of pronunciation, and, finally, in this very art of oratory, invention, arrangement, memory, delivery" (2001). In this list Cicero clearly outlines the later concept of 'liberal arts', which acquired its more or less final form sometime during the 7th century. There are seven liberal arts, which are divided in two main disciplines: 'the Trivium' and 'the Quadrivium'. The Trivium consists of grammar, rhetoric and logic, while the Quadrivium consists of arithmetic, geometry, music and astronomy (ibid). Seven liberal arts are still reflected in organisational structures and curricula of contemporary schools and universities. In this ways, Cicero's views to education have literally shaped the contemporary world.

Insightful engagement in diverse interests requires high levels of skill and motivation. Therefore, human specialisation is a dialectical mix of ability and preference. The most famous example of a polymath – a person whose expertise spans over various fields of arts and science – is definitely Leonardo da Vinci. His success in diverse activities including, but not limited to painting, anatomy, music, science, architecture and writing, have served as on-going inspiration for centuries (Bambach, Stern & Manges, 2003). However, some obstacles cannot be overcome even by the most extraordinary talent. Since the Renaissance, human understanding of the world has significantly grown and it has become increasingly difficult to simultaneously achieve high levels of proficiency in science and arts. Using another concept attributed to Cicero, da Vinci is therefore a mere 'exception that proves the rule' that the inevitable logic of scientific progress had slowly but surely transformed 'the Renaissance man' into 'the Specialist'. However, 'sauce for the goose is often not the same as sauce for the gander'. According to Parker's text written in late 19th century, in ancient Greece and Rome

> the epithet liberalis denoted that which was proper for a free man in contradistinction to that which was suitable for a slave; but it had acquired most of those secondary meanings which are retained in our word 'liberal' now when there are no slaves. A liberal education is a gentleman's education, and the liberales artes were the gentlemanly arts (1890: 417).

During notoriously anti-intellectual Middle Ages feudal masters could at least read and write, while their vassals could see letters only during church processions and tax collections. During the Industrial Revolution, the bourgeois studied science, engineering and economics while the proletariat did petty accounting and basic mechanics. During the nineteenth century, arts suitable for a gentleman have been dubbed 'Really Useful Knowledge' while arts suitable for a slave have been dubbed 'Useful Knowledge' (Johnson, 1988). Deep into the twentieth century, arts suitable for a gentleman have been reflected in classic liberal education consisting of “all-round development of a person morally, intellectually and spiritually” while arts suitable for a slave have been reflected in vocational training (Peters, 1972: 9). Educational specialisation has always been for the poor, while only the rich could afford to freely cross disciplinary boarders. Since the dawn of Western civilisation, disciplinarity has always been dialectically intertwined with education and class.

Disciplinarity and technique

In one of the core textbooks of 'the Frankfurt School', Horkheimer and Adorno clearly link disciplinarity with the Enlightenment.

> The Enlightenment discerned the old powers in the Platonic and Aristotelian heritage of metaphysics and suppressed the universal categories’ claims to truth as superstition. In the authority of universal concepts the Enlightenment detected a fear of the demons through whose effigies human beings had tried to influence nature in magic rituals. (2002: 3)

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In its iconoclastic quest towards modernity, the Enlightenment introduces calculation as the measure of all things. “For the Enlightenment, anything which cannot be resolved into numbers, and ultimately into one, is illusion; modern positivism consigns it to poetry“ (ibid: 4-5).

Based on a similar argument, Herbert Marcuse shows that technology becomes ideological through appropriating values and ideas into own way of functioning. According to Marcuse,

> the historical achievement of science and technology has rendered possible the translation of values into technical tasks – the materialization of values. (...) Consequently, what is at stake is the redefinition of values in technical terms, as elements in the technological process. The new ends, as technical ends, would then operate in the project and in the construction of the machinery, and not only in its utilization. Moreover, the new ends might assert themselves even in the construction of scientific hypotheses – in pure scientific theory. From the quantification of secondary qualities, science would proceed to the quantification of values. (1964: 239)

After entering the field of ideology, technique must necessarily pass beyond the historical stage of neutrality and enter the realm of active politics. Therefore, quantification and calculation of epistêmê are the main reasons which lead to “one of the most vexing aspects of advanced industrial civilisation: the rational character of its irrationality” (ibid: 9).

In the famous 'Only a God can save us' interview, Heidegger succinctly sums up much of the previous argument:

> The fields of sciences lie far apart. The manner of handling their objects is essentially different. This disintegrated multiplicity of disciplines is held together today only through the technical organization of universities and faculties, and through the practical direction of the disciplines according to a single orientation. At the same time, the rooting of the sciences in their essential ground has become dead. (1981)

More recently, in his introduction to 'Technics and Time, 1: The Fault of Epimetheus', Stiegler kicks off the discussion with pre-Homeric distinction between technê and epistêmê, technique and knowledge, arts / crafts and philosophy (1998: 1). Although ancient understanding of those terms cannot be directly translated into the contemporary context, this distinction clearly denotes the existence of two worlds: the world of ideas and the world of practice. According to Stiegler, the conflict between these worlds is the essence of technics. Since the dawn of civilisation, people have always been surrounded by technical entities such as stone carved knives, bow and arrow. However, human development has brought technics into all aspects of the society such as work and social organisation. Therefore, the battlefield between technê and epistêmê is the site of transformation of 'the Renaissance man' into 'the Specialist'. During this struggle, scientific thought has been technicised by a technique of calculation. However, describing the world in elegant mathematical formulae and manipulating them by logical reasoning has taken its toll: epistêmê has lost its identification with love for knowledge. “Technicization through calculation drives Western knowledge down to a path that leads to a forgetting of its origin, which is also forgetting of its truth. This is the ‘crisis of European sciences’” (ibid: 3). A few years after, Steigler concludes that

> Science is then no longer that in which industry invests, but what is financed by industry to open new possibilities of investments and profits. Because to invest is to anticipate; in such a situation, reality belongs already to the past. The conjugation of technology, of science and of the mobility of capital, orders the opening of a future explored systematically by experimentation. This science become technoscience is less what describes reality than what it destabilizes radically. Technical science no longer says what is the case (the ‘law’ of life): it creates a new reality. (2007: 32)

Postmodern approaches derived from 'the Frankfurt School of social science' “often blunt an understanding of contemporary society and unwittingly agitate for a reenactment of the fate of society that constitutes the object of its critique” (McLaren & Farahmandpur, 2005: 20). Therefore, some contemporary critical theorists seek refuge in Marxism which “treats discourses not as sanctuaries of difference barricaded against the forces of history but as always an interpretation naturalized by the libidinal circuits of desire wired into the culture of commerce and historically and socially produced within the crucible of class antagonisms” (ibid: 21). Despite obvious limits, however, 'the Frankfurt School' is still the most relevant reference regarding the relationships

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between technologies, society and human beings (Feenberg, 2002). Based on its rich tradition, I will therefore assert that the rise of technoscience is dialectically intertwined with the rise of disciplinarity.

Disciplinarity and the network

Disciplinarity had always been the poor man's fate – although, admittedly, experts in narrow fields such as watch-making and alchemy have always been highly praised. Following the exponential rise in complexity of our tools, however, disciplinarity has become the new norm in all social strata from surgery to commerce. Literally and metaphorically, information and communication technologies have turned the four-eyed weirdo into the sexy geek; rebel without a cause has transformed into our pimpled next-door neighbour with a hoodie. According to Roli Varma, "the term 'geek' is slang for a person who has encyclopaedic knowledge of computing and is obsessively fascinated by it, but is socially inept, exhibits odd personality traits, excludes normal social and human interests, and spends free time being 'social' on a computer" (2007: 360). Traditionally, narrow specialisation contained in this definition held negative perceptions. However, "the terms geek, hacker, and nerd have negative connotations though recently they have become less pejorative, mostly because they denote competence in technology. Their culture has been described as the 'third culture'; a pop culture based in technology" (ibid). Obviously, popular culture has legitimised the rise of disciplinarity and transformed it into the new normality.

Traditional science has undergone major changes in two opposing directions. Nominally, 'blue-skies research' is more praised than ever. During and after the Second World War, Albert Einstein has become the first branded superstar scientist – his haircut not less iconic than Che Guevara's beard – thus setting a red carpet for his future colleagues. Nowadays, philosophers such as Slavoj Žižek have turned into media superstars who marry supermodels and spend their careers between top league universities, popular festivals and TV studios. Peter Higgs and his 'God's particle' are currently getting more media attention than Madonna. Science has become sexy, and superstar scientists do not live much differently from superstar football players or popular musicians. However, funky science is a rare privilege. The vast majority of scientists are squeezed by exactly opposite trends: budget cuts, job insecurity, increasing bureaucracy... Social science and humanities are slowly but surely being replaced by immediately profitable technological research; explanatory or blue-skies research has been almost completely wiped out by applied research. As a consequence, Braben shows that "new scientific fields are not being created. Today's technologies are short-lived variations on seminal discoveries made decades ago. Intellectual capital is therefore being consumed faster than it is being replaced" (2002: 770). Linking research with economy, he concludes that "if the portfolio of intellectual capital is not expanded, preferably with generic technology, the New Economy brings diminishing returns and puts us on a fast track to global economic stagnation" (ibid: 771).

Braben's Promethean belief that science can solve or at least significantly postpone the world's problems could easily be challenged by Illich's Epithemean insistence on balance between human beings and our environment (1973). However, his analyses clearly describe bitter consequences of the recent changes in structures of scientific research. In the network society, traditional science has experienced a strong polarisation between blue-skies research and applied research with the strong tendency towards the latter. Scientific superstars are here to show the world that 'the real science' still exists. For the most of us, unfortunately, they are mere mannequins: utopian images of 'perfect scientists' and bitter reminders of ancient scientific ideals. Science and research has always gone in hand with education. Unsurprisingly, the world of education is also profoundly divided: in words of Ravi Kumar, there is on one side "a 'teaching aristocracy' that does not consider itself as workers and on the other a pauperised teaching labour force" (McLaren & Kumar, 2009). Recent educational trends such as commodification and McDonaldization of education naturally lower the number of first at the expense of the latter. Day by day, fresh cohorts of teachers and scientists fail into the rabbit hole of Guy Standing's 'new dangerous class' – the precariat – whose existence alternates between sporadic episodes of low-paid adjunct positions and the dole (2011).

The past few decades have caused turmoil at the intersection between disciplinarity, research, education and class. However, the described changes have merely reinforced the existing power relationships and caused further social stratification. There is nothing new under the sun: disciplinarity is still for the poor, and intellectual width is still for the rich. However, the stakes have skyrocketed beyond limits. In many aspects of contemporary life, disciplinarity has created and / or reinforced theoretical and practical dead-ends which may endanger the whole humankind. Physics may develop amazing new nuclear power plants, but we need all sorts of expertise (medical, engineering, biochemical) in order to deal with consequences of disaster in Fukushima.

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Medicine may prolong our lives for a few more decades, but economy must supply pensions and medical care for the long-lived. When computers sneeze, world economy and natural environment catch serious colds: 'butterfly effects' indiscriminately jump across continents, disciplines and systems of reasoning. Newly created fields such as environmental science have no other choice but to draw methods and theories from more than one system of reasoning. Even the most traditional fields, such as philosophy and history, must step down from the 'ivory towers' of their disciplinary methodologies and acknowledge the logic of the network. Challenges pertaining to the contemporary network society are directly opposed to the concept of a strict scientific discipline. Therefore, I propose that networked learning should be analysed beyond traditional disciplinarity.

Just like in ancient Greece, theoretical rejection of disciplinarity is not directly related to organization of daily matters. Most members of our society still make their living by engagement in disciplinary trades such as plumbing, teaching or management. In the complex environment created by the network society, it is highly unlikely to expect the birth of the new 'homo universalis'. Actually, as Illich clearly argues in 'Tools for Conviviality', the very structure of contemporary technologies makes the birth of contemporary Leonardo da Vinci literally impossible (1973). However, rejection of disciplinarity causes tectonic movement in the century-old logic of traditional epistemology. According to Buckler, “the term "postdisciplinarity" evokes an intellectual universe in which we inhabit the ruins of outmoded disciplinary structures, mediating between our nostalgia for this lost unity and our excitement at the intellectual freedom its demise can offer us“ (2004).

The postdisciplinary challenge

In order to provide theoretical background for interpreting various contributions to the field of networked learning, I will try and briefly outline the main postdisciplinary approaches: multidisciplinarity, interdisciplinarity, transdisciplinarity and antidisciplinarity. However, this task is extremely challenging. The aforementioned concepts are still in flux, and the examined sources are packed with conflicting and / or incommensurable definitions, ambiguities and contradictions. Therefore, the following overview is indicative and can merely serve as a point of departure.

“Multidisciplinarity concernes studying a research topic not in just one discipline but in several at the same time“ (Nicolescu, 2008: 2). For instance, automobiles can be studied within the fields of engineering, urban planning, social science, environment and human health. Multidisciplinary approach deepens our understanding of automobiles, and enriches their usage and development. However, its goals are always contained within the realm of a single home discipline. Studies of automobiles and health can be conducted in order to improve car design, and in order to improve the ways we deal with consequences of car design. Multidisciplinary studies can improve either engineering or healthcare: in order to reach further, we must enter deeper into the dialogue between disciplines.

In interdisciplinary research, “an issue is approached from a range of disciplinary perspectives integrated to provide a systemic outcome” (Lawrence and Despres, 2004: 400). Based on analyses of various generic definitions, Shane J. Ralston identifies four main aims of an interdisciplinary research:

> (1) to bridge between academic disciplines, subdisciplines or schools of thought; (2) to recruit a wide range of teachers, students, researchers, professionals and even technologies in order to gain a more complete perspective; (3) to assemble tools or approaches from multiple disciplines in order to resolve an especially challenging problem; and (4) to cross traditional academic boundaries for the purpose of improved research or teaching. (2011: 309)

Transdisciplinarity takes a radically different approach. Here, “the focus is on the organisation of knowledge around complex heterogeneous domains rather than the disciplines and subjects into which knowledge is commonly organised” (Lawrence and Despres, 2004: 400). Transdisciplinary research is “necessary when knowledge about a societally relevant problem field is uncertain, when the concrete nature of problems is disputed, and when there is a great deal at stake for those concerned by the problems and involved in investigating them“ (Hirsch-Hadorn, Biber-Klemm, Grossenbacher-Mansuy, Joye, Pohl, Wiesmann & Zemp, 2008: 37). On such basis, Andreas Novy asserts that transdisciplinary knowledge

> is context-sensitive and grasps complexity, integrates multiple perspectives and opposing interests. In such settings, transdisciplinarity takes an ethical position in favour of rationality and democracy and creates places of dialogue, based on an educational approach that questions

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> assumed certainties. As action and reflection are dialectically related, the identification of socially relevant problems is crucial for social action. (2012: 138-139)

As of recently, there is a growing body of research on antidisciplinarity (Giroux & Couture, 2012; Kristensen & Claycomb, 2010). According to Kristensen and Claycomb, antidisciplinarity "provides the grounds for a critique of the limits on knowledge production in other disciplines" (2010: 6). In the conceptual framework of antidisciplinarity, "every question may be asked and every change may be considered" (Giroux & Karmis, 2012). As opposed to interdisciplinary and transdisciplinary approaches, antidisciplinarity does not try to recombine disciplinary knowledge in order to produce a new quality. Instead, it fundamentally resists all disciplinarity (ibid).

The multidisciplinary nature of networked learning is widely recognised: computers are simultaneously studied in schools of computing, sociology and education, while education is simultaneously studied in schools of education, philosophy and computing. Interdisciplinarity is accepted widely, but not universally: some researchers naturally transfer knowledge and methods between disciplines, while others still insist on traditional methodological approaches. During the past few years, several researchers have independently shown that the field of networked learning is equally concerned with all main spheres of human interest identified by Habermas - the technical, the practical, and the emancipatory - and arrived to the conclusion that the most appropriate research strategy for networked learning is transdisciplinarity (Novy, 2012; Jandrić & Boras, 2012; Hirsch Hadorn et al, 2008). Finally, recent inquiries into the elusive field of antidisciplinarity are completely 'off the known charts' and can be interpreted merely as 'food for thought'.

In the context of contemporary learning, opportunities and limitations created by the network are just as relevant as opportunities and limitations created by human nature, myth and custom: the first normally belong to science and engineering, while the latter are usually associated with humanities and social science. Therefore, the metaphor of migration from learning in the industrial society to learning in the network society sets the clear path towards postdisciplinary research methods. In order to analyse that path, this research examines the role of disciplinarity in three interlocking themes: the history of human learning, the relationships between technologies and human beings, and the human condition in the network society. Inspired by the metaphor, science also identifies various problems with disciplinary approaches to networked learning and proposes their solution in postdisciplinarity. In the context of an established academic discipline, however, such proposal has very serious consequences, because any inquiry into issues concerning disciplinarity is directly related to the very nature of method and knowledge. To most people, multidisciplinarity arrives naturally because it does not seem to significantly intervene into the existing structure of our understanding of the world. Moving away from traditional science, however, consequent methodological frameworks – interdisciplinarity, transdisciplinarity and antidisciplinarity – are increasingly harder to comprehend because each of them requires making one more significant step beyond the existing patterns of thinking.

Instead of resolving the problem, therefore, this research has opened a 'Pandora's Box' of epistemological questions. Some people will continue to conceive the field of networked learning as a collection of disciplinary research efforts, while others will use one or another postdisciplinary system of reasoning in order to place various streams of research into a wider system of meaning. To each their own: at this stage of methodological development, all approaches are completely legitimate. This paper merely outlines problems pertaining to disciplinary approaches to networked learning, and brings them to the attention of scientific community. It indicates that postdisciplinary approaches might transcend current methodological limits to networked learning research, warns about the vast amount of unresolved theoretical and practical questions, and calls for further investigation. Our research methods may still be grounded locally, but our eyes should be directed high into the blue skies of a unified explanatory framework for networked learning.

References

Adams, D. (1995). The Hitchhiker's Guide to the Galaxy. London: Macmillan.

Arendt, H. (1998). The human condition. 2nd Edition. Chicago & London: The University of Chicago Press.

Bambach, C., Stern, R., & Manges, A. (2003). Leonardo da Vinci, master draftsman. New York: Metropolitan Museum of Art New York.

Braben, D. W. (2002). Blue Skies Research and the global economy. Physica A, 314, 768 – 773.

Buckler, J. A. (2004). Towards a new model of general education at Harvard College. Retrieved 14 April, 2013, from http://isites.harvard.edu/fs/docs/icb.topic733185.files/Buckler.pdf.

Cicero, M. T. (2001). Cicero on the Ideal Orator (De Oratore). Oxford: Oxford University Press.
Dirckinck-Holmfeld, L.; Hodgson, V. & McConnell, D. (Eds). (2012). Exploring the Theory, Pedagogy and Practice of Networked Learning. New York: Springer.
Feenberg, A. (2002). Transforming Technology: A Critical Theory Revisited. 2nd Edition. New York: Oxford University Press.
Fraser, J. T. (1992). Pioneers have no maps, but they do inherit tools. Time & Society, 1(1), 9-11.
Giroux, D. & Karmis, D. (2012). Call for papers: Cahiers de l'idiotie No 6 – Université/University. Ottawa: Cahiers de l'idiotie. Retrieved 14 April, 2013, from http://www.cahiers-idiotie.org/.
Goodyear, P.; Banks, S.; Hodgson, V. & McConnell, D. (Eds). (2004). Advances in Research on Networked Learning. Dordrecht: Kluwer.
Heidegger, M. (1981). "Only a God Can Save Us": The Spiegel Interview. In T. Sheehan (Ed.), Heidegger: The Man and the Thinker. Chicago: Precedent Press, 45-67.
Hirsch Hadorn, G., Biber-Klemm, S., Grossenbacher-Mansuy, W., Joye, D., Pohl, C., Wiesmann, U. & Zemp, E. (2008). The emergence of transdisciplinarity as a form of research In G. Hirsch Hadorn, H. Hoffmann-Riem, S. Biber-Klemm, W. Grossenbacher-Mansuy, D. Joye, C. Pohl, U. Wiesmann & E. Zemp (Eds.), Handbook of Transdisciplinary Research. Berlin: Springer, 19-42.
Hodgson, V.; de Laat, M.; McConnell, D. & Ryberg, T. (Eds.). (2014). The Design, Experience and Practice of Networked Learning. New York: Springer.
Horkheimer, M. & Adorno, T. W. (2002). Dialectic of Enlightenment: Philosophical Fragments. Stanford: Stanford University Press.
Illich, I. (1973). Tools for Conviviality. London: Marion Boyars Publishers Ltd.
Jandrić, P., & Boras, D. (2012). Critical e-learning: Struggle for Power and Meaning in the Network Society. Zagreb: FF Press & The Polytechnic of Zagreb.
Johnson, R. (1988). "Really useful knowledge" 1790-1850: memories for education in the 1980's. In T. Lovett (Ed.), Radical Approaches to Adult Education: A Reader. London: Routledge, 3-34.
Kristensen, R. G. & Claycomb, R. M. (Eds.). (2010). Writing Against the Curriculum: Anti-disciplinarity in the Writing and Cultural Studies Classroom. Plymouth: Rowman & Littlefield Publishers, Ltd.
Lawrence, R. J. & Després, C. (2004). Futures of Transdisciplinarity. Futures, 36(4), 397-405.
Marcuse, H. (1964). One-Dimensional Man. Herbert Marcuse Archive.
McLaren, P. & Farahmandpur, R. (2005). Teaching against global capitalism and the new imperialism. Oxford: Rowman & Littlefield Publishers, Inc.
McLaren, P. & Kumar, R. (2009). Peter McLaren in an interview with Ravi Kumar: Being, Becoming and Breaking-Free: Peter McLaren and the Pedagogy of Liberation. Radical Notes, February 19. Retrieved 14 April, 2013, from http://radicalnotes.com/2009/02/19/being-becoming-and-breaking-free-peter-mclaren-and-the-pedagogy-of-liberation/.
McLuhan, M. (1962). The Gutenberg Galaxy: The Making of Typographic Man. Toronto: University of Toronto Press.
Nicolescu, B. (2008). In Vitro and In Vivo Knowledge – Methodology of Transdisciplinarity. In B. Nicolescu (Ed.), Transdisciplinarity – Theory and Practice. New York: Hampton Press, 1-22.
Novy, A. (2012). Unequal diversity" as a knowledge alliance: An encounter of Paulo Freire's dialogical approach and transdisciplinarity. Multicultural Education & Technology, 6(3), 137 – 148.
Parker, H. (1890). The Seven Liberal Arts. The English Historical Review, 5(19), 417-461.
Peters, R. S. (1972). Education and the Educated Man. In R. F. Dearden, P. H. Hirst & R. S. Peters (Eds.). Education and the development of reason. London: Routledge and Kegan Paul, 3-19.
Pickover, C. A. (2008). Archimedes to Hawking: Laws of Science and the Great Minds Behind Them. Oxford: Oxford University Press.
Ralston, S. J. (2011). Interdisciplinarity: Some Lessons from John Dewey. American Dialectic, 1(2), 309-321.
Shaull, R. (2000). Foreword. In P. Freire, Pedagogy of the oppressed. New York, London: Continuum International Publishing Group, 29-35.
Standing, G. (2011). The Precariat: The New Dangerous Class. London: Bloomsbury Academic.
Stiegler, B. (1998). Technics and Time, 1: The Fault of Epimetheus. Stanford: Stanford University Press.
Varma, R. (2007). Women in Computing: The Role of Geek Culture. Science as Culture, 16(4), 359 – 376.
Waits, T. [Delluvian]. (2001, April 24). ASCAP Awards 2001 [Video file]. Retrieved 14 April, 2013, from http://youtu.be/qEyPhm98WaE.

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