

IT DOESN'T MATTER WHAT IS IN THEIR HANDS: UNDERSTANDING HOW STUDENTS USE TECHNOLOGY TO SUPPORT, ENHANCE AND EXPAND THEIR LEARNING IN A COMPLEX WORLD

Peter Bryant

*London School of Economics and Political Science (UK)
Houghton Street, London WC2A 2AE, UK*

ABSTRACT

Perspectives on the use of technology in teaching and learning have been increasing polarised, with positions entrenched around the efficacy of using technology in lectures, the distractions assumed to arise from social media and the temporality and ephemerality of knowledge located outside the academy. This paper presents the preliminary collective findings from several analytical projects arising from an innovative consultation project at the London School of Economics called LSE2020. This project was a central component of how we designed and delivered the strategic implementation of pedagogical change at the School. It sought to identify barriers and opportunities that can emerge from the integration of technology at a curricular and delivery level. The primary finding of the study is that students used and valued the effectiveness and benefit of the technologies that were provided to them by the institution and technology they chose to use themselves in different ways. The technology provided by the institution such as the Virtual Learning Environment and lecture recording facilitated actions aligned with the necessity to succeed, whilst their own technologies were part of wider approach to understanding and coping with the intersecting pressures of personal, professional and educational lived experiences.

KEYWORDS

Technology Enhanced Learning, Pedagogical Change, Social Media, Higher Education

1. INTRODUCTION

There is a growing body of research and practice informed literature that argues against the efficacy of technology to support effective student learning and academic practice (see e.g. Rockmore, 2014, Rosenblum, 2017, Holstead, 2015, Ravizza et al., 2017, Patterson and Patterson, 2017, Mueller and Oppenheimer, 2014). Many of these studies start with the premise that student use of technology and social media (in the narrow confines of face to face teaching) distracts from and diminishes their learning (Taneja et al., 2015) or represents an inferior way to engage in learning activities in the classroom (Mueller and Oppenheimer, 2014). With topics ranging from the positive benefits gained from banning laptops in a lecture theatre through to the distractions inherent in the apparent overt engagement with social media by students during lectures, these articles have set out battle lines in what could be described as a fake war between protectors and challengers, defenders of the faith versus the barbarians at the gate (Anonymous, 2016, Rockmore, 2014, Rosenblum, 2017). As Aran Levasseur (2011) argues in the article 'Teaching without Technology' in the wider context of school education:

The conflict between computers and schools is really a conflict between educational paradigms. The traditional and dominant paradigm is rooted in the book and the pedagogy is one of transmission. Teachers, who have presumably read more books than their students and listened to more scholarly lectures, transmit what they've learned to their students in a similar fashion. The students who do best within this system are those who can capture the transmission — as unfiltered as possible — and mirror back to the teacher what they have delineated. Within this model, digital technology can provide improvements, but they are cosmetic. (Levasseur, 2011).

The rebellion against the use of technology described in many of these articles is underpinned by an argument that asserts that it is the academic that knows what is best to encourage and enhance student learning in the classroom. This is framed within an argument that there are behaviours that the academic adjudges to be educationally relevant and these behaviours are undermined by the distraction of news, images, selfies and shiny things that are assumed to proliferate within the students use of technology such as laptops, phones and social media (Aagaard, 2015). The academic is argued to have a privileged role; part distributor of established knowledge, part assessor of scope and scale of learning and part martyr for the cause of student learning defining what is a distraction and how technology is assumed to be used (Roberts and Rees, 2014). Some writers argue that the academic becomes the 'police officer' for preventing distracting technology use and thereby enhancing student learning (Gupta and Irwin, 2016, Selwyn, 2016, Wright, 2016). There are several examples where the academic has advocated for and delivered the shutting down the Wireless network, punishing students for laptop use or the confiscation of devices from students (Baker et al., 2012, Hanson et al., 2010, Berschback, 2010). Almost of all the examples in the literature are predicated on there being a dominant form of teaching (didactic lecturers) that requires the student to learn through consumption of knowledge and listening. The teacher holds all the knowledge and the only way students can obtain it to listen and note-take. A good example comes from an anonymous academic publishing in *The Guardian* in 2016, who notes:

When did it become acceptable to use your phone throughout a lecture, let alone an entire conference? No matter how good you think you are at multitasking, you will not be truly focusing your attention on the speaker, who has no doubt spent hours preparing for this moment. (Anonymous, 2016)

There are several critical assumptions inherent in this paragraph, around what the student is using the mobile device for and the relative politeness arising from its use in the lecture, the capacity of individual learners to multi-task in a digital world and the importance of the words and actions of the speaker to the learner (not to mention the quality of the teaching of speaker involved in terms of how effective they are at communicating and sharing knowledge and understanding). This argument positions technology as the 'bad' force and the users of it as people who are rude, insensitive or ungracious for the efforts of the speaker concerned. Holstead (2015) makes similar assumptions about the disruption to learning that arises from the use of technology to multi-task. Drawing on a hypothesis from a pre-digital age, the author asserts that laptops encourage students to try and transcribe lectures in their entirety whilst pen and paper supports more holistic, structured note-taking which the author concludes enhances the learning outcomes for her students:

I knew that eliminating laptops in my classroom would reduce distractions. Research has shown that when students use their laptops to "multitask" during class, they don't retain as much of the lecture. But I also had a theory, based on my college experience from the dark ages—the 70s, aka, before PowerPoint—that students would process lectures more effectively if they took notes on paper. When students took notes on laptops they barely looked up from their computers, so intent were they on transcribing every word I said. Back in my day, if a professor's lectures were reasonably well organized, I could take notes in outline format. I had to listen for the key points and sub-points. (Holstead, 2015)

There are common threads running through these articles in terms of the attitudinal and behavioural aspects of the teachers and students under study (although it is interesting to note that only a small number of these studies or articles talk about or to students directly, referring to them generally in the abstract). Firstly, there is the argument that either explicitly or tacitly the modern learner engages in behaviours that are different to the ones they exhibit in their professional practices or used during their own studies (as exhibited by Holstead). Secondly, there is the assertion that social media is used by students to waste time, as a distraction from the learning being presented from the podium or as a way of avoiding learning altogether (what Taneja et al (2015) labels as cyber slacking). Egan (2016) makes this case explicitly arguing that social media only serves to engage students in superficial, identity driven social interaction:

We should be teaching students computer programming so that they can use these machines in ways limited only by their imaginations and effort. We should be discouraging them from wasting their days fretting over the trivial details of who thinks what about whom in their group, updating their "statuses", and sharing the pictures that they think puts them in the best possible light (Egan, 2016).

Facebook is cited frequently as the platform that distracts students the most from the learning in lectures and classes (Rosen et al., 2013, Bugeja, 2007, Gupta and Irwin, 2016). Sørensen (2014) illustrates this point by assuming that all Facebook use in his classes (25-50% of students from his research) competes with the academic for the attention of students:

The fact is that a large proportion of students are not mentally present during class. This then leaves the rest of the student group permanently distracted by those “leaving class” via social media: the tantalising Facebook logo popping up on some students’ screens will inevitably fuel everyone’s fear of missing out. The teacher is then left to the merciless competition with the social media for the students’ attention – a competition even the most gifted teacher will eventually lose. (Sørensen, 2014)

In this introduction, I have presented some of the counter-arguments to the efficacy of technology and social media in higher education as a demonstration of a seemingly growing trend in the literature and the popular and educational press. Clearly, there is a strong tradition of literature that explores and interrogates how technology and social media can enhance the learning for students (see e.g. Nykvist and Lee, 2013, Caplan et al., 2014, Greenhow and Lewin, 2016, Berger and Wild, 2016, Ada et al., 2017). What is interesting is that many of these studies and the hundreds similar are not offered as counter cases to the more personal assertions of the negative impacts of technology, instead they are presented as the accepted lore of modern teaching for which the anecdotal and sometimes scientific evidence they present attempts to counter (Barry et al., 2015, Prestridge, 2012).

2. LSE2020 AND THE STUDENT USE OF TECHNOLOGY IN LEARNING

At the London School of Economics and Political Science, in the United Kingdom (LSE), we have been engaged in a strategic process of pedagogical change designed in response to several critical drivers for enhancing teaching and learning in the modern age. Using a design thinking approach to inform the strategic and operational approaches we undertook (Meinel and Leifer, 2010), the problems of student satisfaction, teaching quality, the balance between research and teaching and increasing global competition were visualised the university as a series of overlapping spaces, representing where students, academic staff, professional services teams and society reside and intersect in teaching and learning. Change was approached not as top-down or bottom-up initiative driven by managerial objectives or the enthusiasm of the engaged, but as a design process of identification, experimentation and collaboration, with change as the wicked problem at the centre. Critical to this process was the necessity of finding commonality within those spaces, with technology a contradictory and challenged piece of the puzzle.

Essentially a face-to-face experience, teaching at the LSE utilises technology in inconsistent ways, ranging from simple replication of analogue practices such as media broadcasting and dissemination of materials such as slides or notes through to highly engaged and innovative student-led creation and production of knowledge projects. Students actively engage with the systems and platforms provided for them by the University, with successful institutional and student engagement with the Virtual Learning Environment, originality reporting and lecture recording over the last ten years. Student feedback including the National Student Survey consistently values the institutional technology and demands the increased use of it by academics, locating those technologies at the very heart of their success in a complex and competitive higher education experience. Presented with challenging metrics of student satisfaction and teaching quality, the School identified technology as a critical lens to understand and deliver essential and necessary pedagogical change. We developed a strategy called *Learning, Teaching and Technology Futures* which set out to build an engaged and critical learning and teaching community at the LSE and reconfigure the student experience at the School. Critically, it was not a e-learning strategy or a technology enhanced learning strategy. The strategy was a framework to understand the interactions between people and technology, the resistances and affordances that emerge from the use of technology and technology informed practices in education. It recognised the complexities of the overlapping spaces within the School, with implementation models such as compliance, coercion, opting-out or quality assurance providing little or no scope for a successful transformation.

The first stage of implementing this strategy was to identify the environmental factors that slowed down or potentially resisted the scaling up and sustainability of pedagogical change through technology. Myths build up within institutions about the efficacy of technological interventions, designed in part, to resist engaging in processes that challenge current practice or require significant re-thinking of the ways in which teaching and learning are enacted (Bryant et al., 2014). These myths create walled gardens of practice, where the calls for change are challenged by anecdotal assertions, rusted-on custom and practices, institutional inertia and sometimes outright resistance. Taking an almost adversarial perspective to the use of technology

by both students and staff, interventions by the institution to effect change can become polarised debates rent with assumptions about how technology is used and for what purposes (a case seen to great effect in some of the articles discussed in the introduction). Instead of engaging in the more traditional consultation processes (listening exercises, working groups, committees etc.) to address those concerns and to design the strategy to respond to them, we took a different approach. We undertook a civic engagement informed approach that draws on the principles of crowd learning, digital citizenship and social media practice to better understand the spaces in which people engaged in learning. We planned a series of innovative interventions using a variety of different methodologies, such as hacks, crowdsourcing, conversations, debates, provocations and media-making to involve and give ownership to staff, students and the LSE community in the programme of change. We decided to start this conversation with the students. Both in the literature and from the anecdotal experiences we had heard coming from our students, the idea that education as something that needed to be ‘done’ to students, sometimes unwillingly was an assumption we wanted to challenge. Social media was a distraction, laptops diminished their capacity for successful learning, the Internet was a site for cheating and essay mills, plagiarism detection could be ‘gamed’ if it was made available, lecture recordings decreased attendance at lectures. It was critical to expose the assumptions behind these assertions and understand how students used technology for the learning and how their use of technology bled between their contexts of life, education and work.

LSE2020 is an innovative programme designed to be the catalyst for these conversations. The intention of LSE2020 is to provide students the opportunity to engage in conversations, discussions and debates with each other and with the School. Through recording and distributing these conversations on social media with people outside the institution, we added a sense of identity, sharing and critical thinking to the conversations. Filming conversations, group discussions and more formal interviews with nearly two hundred students over two years, LSE2020 focused on how students at the School use technology and social media for their learning, their career and across the ways they choose to live their lives. What emerged were authentic stories of how LSE students study, how they engage with other students both inside and outside the School and what it means to be a modern student at the LSE. LSE2020 identified how students engaged in collaborative practices such as Google Docs being used for collective lecture note-taking, professional and personal identity (the use of Facebook for group work and peer learning) and the de-location of study from the physical campus into social media apps like Snapchat, Whatsapp and Instagram:

So, I mean, we’re able to connect with each other on another level than if like I would have during undergrad and I think a huge part of that is through social media platforms like Facebook where you’re able to, you know, if we have an event coming up in our core of work, like she and I will both know about it, we don’t really have to chat with each other, we’ll see it on Facebook which is incredibly helpful (Student interview from LSE2020 stage 2).

3. METHODOLOGY

Starting with 182 three-minute video conversations conducted between 2016 and 2017 and adding a survey that asked similar questions of a further 250 students in 2017, LSE2020 generated over 150000 words of data centred on how students use technology to engage in and support their learning for LSE courses and programmes and more widely how it intersected their personal, professional and educational lives. The way these conversations evolved was critical, as they were not based on a question/response model, interviewer and interviewee taking specific roles active and passive roles. Instead, the use of students and recently graduated students (working as interns) as conversants within the research design and the process itself of engaging in filmed but informal conversations facilitated a sense of openness and resonance in the responses. The results presented here are a snapshot of several intersecting analytical projects looking at learning, wellbeing, digital capability, normalisation and literacies. These studies are using several different methodological approaches including grounded theory, content analysis and thematic analysis to extract the insights from the interviews and conversations. This preliminary study collates the findings from these on-going analytical projects, along with the more strategic and operational interpretations that came from the project. Ultimately it is critical to note that LSE2020 is not a research study. It is designed to inform pedagogical change at the School and engage the students as active participants in that change. These students provided information and insights to the project to better inform their own and future colleagues educational experiences. It is through that lens that the data analysis used in this paper drew its conclusions.

4. FINDINGS

Two main themes emerged from the data, centred on the technology the institution enforced or compelled them to use and the technology they chose to apply to their own learning. The first, emerging primarily from the first stage of the project started in 2016, looked at the technology and practices the institution provided for students and how they engaged with the learning activities initiated by that technology. The second theme emerged from the second stage in 2017. Defining technology and social media use in a more holistic sense, entangled in the student's wider contexts of work and life, LSE2020 explored the technology and social media practices the students brought to their learning and how they used those technologies to undertake learning activities.

4.1 Understanding our Technology and what we want them to do with it

Most institutions provide students with a variety of higher education specific technologies to complete specific tasks required for verification, dissemination, assessment and participation. These technologies are often specific to the education sector, but draw on more established universal principles and practices for using technology (communications and file sharing for example). The first LSE2020 interviews focused almost exclusively on these technologies, although not by design. When asked questions about what technologies they used for learning, students defaulted to discussing the technologies the institution had given them or that their academic used in their teaching and assessment. We found that students only were willing to describe the platforms that were directly related to their teaching and learning experience. To that end, students did not know what and how technology could be used to enhance teaching and learning both now and in the future. In simple terms, students used the institutional systems to support achievement, obtain the grade they needed and to effectively complete the requirements of the course (Liote and Axe, 2016). Where they were not exposed to different educational technologies over and above what their teachers used, they had no imperative or capacity to find out more about that technology. This was especially prescient as 75% of the students observed that their teachers used no technology at all or just PowerPoint, although every course at the School has a Moodle site and 65% of undergraduate lectures are recorded and made available to students:

I don't think we understand what we are missing out on in any way because [...] we don't know what technology is available and how it is changing (Student interview from LSE2020 stage 1).

You only know what's possible if you've seen it in the first place. I don't really know what alternatives there are to PowerPoint (Student interview from LSE2020 stage 1).

Where the students were exposed to technology in their teaching (aside from PowerPoint), they suggested a vision for teaching that engaged in online and blended delivery, closer and more engaged social media contact between students and in smaller numbers, between staff and students and ways to make their lecturers more interactive. None of these responses generally challenged the dominant paradigm of teaching and learning, but described pathways through it. Despite raising concerns about the look and feel of Moodle (the School's Virtual Learning Environment), the unreliability of some systems and the quality of lecture recordings, they did not see their role as one that effected change in those systems. They needed to use this provided technology in ways that were necessary, get what they needed and complete the requirements of the course. This perspective was reinforced by a student interviewed in stage 2 who noted:

Moodle. I love because it gives me the opportunity to enrol in any class outside of my programme and look at the curriculum and the readings and it's a really great platform for me to get access to course material. I love that they include the reading lists, everything is in one place, so I think it's easy to use. Um, and it has the essential components needed to be, to do well in class but same, yeah like I know Moodle has like more functions to chat, discuss but I've never used the functions just like to see the curriculum material, like downloading material. Basically, for that function only for me (Student interview from LSE2020 stage 2).

4.2 Understanding their Technology and how they use it

Insights about the use of technology in learning were not prevalent in the first stage of interviews. The notion that students did not know what they did not know necessitated some significant rethinking about the process. If LSE2020 was to be a critical conversational pathway to facilitating change and disengaging from the them and us antagonism described in the earlier section, the discussion had to allow the emergence of

insights into practices and devices that perhaps the students did not think were the exclusive purview of education or in fact perhaps did not consider to even be technology. One of the most telling demonstrations of this was in Stage 1, where one undergraduate was asked what technology they used for learning and listed Moodle and the reading list system. When pressed by the interviewer the student that they used no other forms of technology. In front of the student in the video was their laptop, tablet and mobile device, all active. The conversations in stage 2 turned from what technology do you use to how do you use technology and social media. These question approaches opened up streams of conversation around identity, bullying culture, communications, collaborative work, management of time and most critically how learning, life and work intersect

The technologies and practices students engaged with outside of their formal learning activity (lectures, classes, readings, assessments etc.) supported metacognition, network development and sociality. These technologies were out of the direct control of the institution and rarely embedded in curriculum and assessment. These technologies were owned and managed by the student, were multi-functional in that they were used for both personal and educational activities. What we found to an almost overwhelming degree is that student use technology to communicate, almost to the exclusive detriment of other forms of communications. Over 95% of the students we talked to used apps, mobile devices, Moodle, Facebook or other social media to plan, meet up, collaborate, do assignments, share notes, verify and validate information, collect data and a wide range of other learning activities. Ranging from personal devices such as smartphones and laptops through to social media platforms that support interaction, engagement and collaboration such as Whatsapp, Facebook, Snapchat and Google Docs, these technologies were not exclusively deployed for education. They were part of the way students lived, with devices and applications used for specific and identifiable purposes, but not just for study or learning, or engaging with other students:

I will reach out to social media and ask my friends, okay what do you think about this? Do you agree with this? (Student interview from LSE2020 stage 2)

If I meet someone [...] I'll never ask for their number I'll always ask for their Facebook. (Student interview from LSE2020 stage 2)

You've got like a Google Doc, everybody can comment on what you write during the lecture, someone types what the lecturer says and other people comment on it. (Student interview from LSE2020 stage 2)

Whilst these short excerpts from the interviews are descriptive in nature, there were part of a much wider narrative contained within many interviews. One of the students interviews above noted how they used social media to validate and verify difficult concept with their friends. Placed back in the context of the wider response, the student told a much richer story of how they used technology in their everyday lives, the emotions, anxieties and possibilities it created and the capacities it provided to get things done:

For my studies I use my smartphone. For the majority of it it's my laptop. I look at readings on my laptop. I take notes on my laptop. Sometimes side by side I'll have the readings, the pages I'm taking notes on concurrently so I can switch back and forth very easily. If I want supplemental information, I can very easily Google up certain things I might have questions about or articles I might immediately relate to any theoretical concepts that I am studying or practical studies that I'm looking at the supporter, degrade it. I also use Facebook when I see a particularly interesting concept that either makes me mad, is quite controversial or I really agree with or something that I'm trying to puzzle out. So I will reach out to social media and ask my friends, okay what do you think about this? Do you agree with this? Where do you think this might be wrong or where do you think it's strengths are or how controversial the statements are, how they are wrong in all the wrong ways (Student interview from LSE2020 stage 2).

Across this response, which was mirrored by those of many other students, the complexities of life, work and study and how they are shaped and conducted through and with technology is apparent. Challenges to authenticity of knowledge, the primacy of the voice and opinion of the academic, the criticality of the experience of 'being there' at the lecture and the importance of the network are all present in a single 180-word response. Similar assertions were held by a significant majority of respondents who engaged in varying degrees of personal and collective reflective criticality about the efficacy, ethics or societal impacts of using technology or social media. What was most prescient about their insights was that much of this happened despite the deficit of technology use by teachers or the sometimes-active lobbying against it. A good example was where students collectively organised through Facebook to take and share lecture notes on Google Docs. These were updated and honed by students, tested against the lecture recordings and the link shared through back through Facebook. Whilst it might seem that these students were surfing Facebook or residing within the Google ecosystem *instead* of 'studying', they were in fact engaging in learning activities (the effectiveness of which was clearly not measured by this study). This engagement was collective, did not actively involve the teacher to validate or gatekeep the ways in which knowledge was recorded and

diversions and distractions minimised and was shared widely with the community of learners, even when the technology that the institution gave to them was not working, with one student noting:

Um, well the lecture recording has been very useful lately but it's not been working perfectly. (I used) not a software but maybe a social media where, a Facebook for LSE where you can turn files that would be like helpful to group, to share information. We use that now as a Facebook group for the whole generation of my classmates and every time that we want to share a book we have to put the link and make the link bespoke so in terms of sharing information or files, it could be like easier (Student interview from LSE2020 stage 2).

5. CONCLUSION

The strategic pedagogical change that started the need for these types of conversations is by no way complete at the LSE. We are only at the very early stages of interrogating how the student-led use of technology and how they engage in the technology provided by the institution can make learning better. We have continued to take a step back and interrogate what it meant to do an LSE education in the post-digital age. We set out a vision for our future that we are still delivering today. The complex, multi-disciplinary, research intensive environment located within disciplines and work environments are technologically innovative and demand a high level of literacy. Equally, they demand an agile engagement with technology and social media that can create tensions, debates, competition for resources. But these tensions can force change to be informed by people, by research and by commitment. LSE2020 has begun to identify the information and insights about both side of this 'debate'. The outputs of LSE2020 are revealing the tensions experienced by students and staff in ways that make the assertion of unsubstantiated assumptions difficult or redundant. The students involved in LSE2020 were not concerned what their academics thought they were doing with their technology and clearly wanted to demonstrate what they were doing with ours. They just got on and did what they needed to do in order to learn and to succeed. Study was described in sometimes stressful, complex and difficult terms by the students. Workloads, time management, efficiency, expectations and anxiety were all part of the reason why students sought out technology. Technology was sometimes the only thing that they believed kept their head above water in an educational environment demanding not just learning and participation, but economic stress, separation from home and family and living and surviving in a city like London.

The way technology is used to collaborate, share, critique, engage shapes the way we communicate. To ignore technology and social media and its transformative community of practices would be a dangerous ignorance for higher education institutions, mainly because despite all the talk of kill switches and pen and paper, technology use by students (and staff will always happen). That doesn't mean we have to all communicate through twitter in 140 characters, nor does it mean that crowdsourcing and Yelp recommendations will replace academic knowledge as the purest form of thought. But it is in those very defences against using technology that one of the most fundamental tensions in higher education lies; you are either with us or against us. It is a polarised debate, with no middle ground and a series of entrenched positions backed with rigid institutional structures and policies and with all the risk dumped heavily on the shoulders of students. How do students respond to this? Through LSE2020 they told us to use our technology better. And then they can be left on our own to study and prepare and learn. What LSE2020 suggested was that it did not matter what devices were in their hands, they will be there and they will be used not just for study, but work and for life. Perhaps the most important insight for the institution is knowing that what they are using and how they choose to use technology and social media empowers both them and us to make better learning experiences.

REFERENCES

- Aagaard, J. 2015. Drawn to distraction: A qualitative study of off-task use of educational technology. *Computers & Education*, 87, 90-97.
- Ada, M. B., Stansfield, M. & Baxter, G. 2017. Using mobile learning and social media to enhance learner feedback. *Higher Education*, 9, 70-90.
- Anonymous. 2016. I'm a serious academic, not a professional Instagrammer. *The Guardian*, 5th August 2016.

- Baker, W. M., Lusk, E. J. & Neuhauser, K. L. 2012. On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business*, 87, 275-289.
- Barry, S., Murphy, K. & Drew, S. 2015. From deconstructive misalignment to constructive alignment: Exploring student uses of mobile technologies in university classrooms. *Computers & Education*, 81, 202-210.
- Berger, D. & Wild, C. 2016. Turned on, tuned in, but not dropped out: enhancing the student experience with popular social media platforms. *European Journal of Law and Technology*, 7.
- Berschback, R. 2010. Everything that new and adjunct business faculty members should ask about teaching, but don't know enough to ask. *Journal of College Teaching and Learning*, 7, 13.
- Bryant, P., Coombs, A. & Pazio, M. 2014. Are we having fun yet? Institutional resistance and the introduction of play and experimentation into learning innovation through social media. *Journal of Interactive Media in Education*, 2014, Art. 4.
- Bugeja, M. J. 2007. Distractions in the wireless classroom. *Chronicle of Higher Education*, 53, C1-C4.
- Caplan, W., Myrick, F., Smitten, J. & Kelly, W. 2014. What a tangled web we weave: How technology is reshaping pedagogy. *Nurse education today*, 34, 1172-1174.
- Egan, G. 2016. Why academics should NOT make time for social media. *Times Higher Education*. London.
- Greenhow, C. & Lewin, C. 2016. Social media and education: reconceptualizing the boundaries of formal and informal learning. *Learning, Media and Technology*, 41, 6-30.
- Gupta, N. & Irwin, J. D. 2016. In-class distractions: The role of Facebook and the primary learning task. *Computers in Human Behavior*, 55, 1165-1178.
- Hanson, T. L., Drumheller, K., Mallard, J., Mckee, C. & Schlegel, P. 2010. Cell phones, text messaging, and Facebook: Competing time demands of today's college students. *College teaching*, 59, 23-30.
- Holstead, C. E. 2015. The Benefits of No-Tech Note Taking. *The Chronicle of Higher Education*.
- Levasseur, A. 2011. Teaching Without Technology? *Mediashift* [Online]. Available from: <http://mediashift.org/2011/11/teaching-without-technology-314/> [Accessed 3rd September 2017].
- Liote, L. & Axe, H. 2016. LSE 2020: Capturing the Student Voice On the Future of Educational Technology. London, UK: London School of Economics and Political Science.
- Meinel, C. & Leifer, L. 2010. Design thinking research. *Design thinking: understand–improve–apply*. Springer, Heidelberg.
- Mueller, P. A. & Oppenheimer, D. M. 2014. The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological science*, 25, 1159-1168.
- Nykvist, S. S. & Lee, K.-T. 2013. Mixing higher education teaching and learning with mobile devices and social media. *Proceedings of IAC-ETeL 2013*.
- Patterson, R. W. & Patterson, R. M. 2017. Computers and productivity: Evidence from laptop use in the college classroom. *Economics of Education Review*, 57, 66-79.
- Prestridge, S. 2012. The beliefs behind the teacher that influences their ICT practices. *Computers & Education*, 58, 449-458.
- Ravizza, S., Uitvlugt, M. & Fenn, K. 2017. The negative effects of laptop internet use during class. *Neuroscience Letters*, 637, 44-49.
- Roberts, N. & Rees, M. 2014. Student use of mobile devices in university lectures. *Australasian Journal of Educational Technology*, 30.
- Rockmore, D. 2014. The Case for Banning Laptops in the Classroom. *New Yorker*. New York, NY.
- Rosen, L. D., Carrier, L. M. & Cheever, N. A. 2013. Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior*, 29, 948-958.
- Rosenblum, D. 2017. Leave Your Laptops at the Door to My Classroom On Campus. *The New York Times*, January 2nd.
- Selwyn, N. 2016. Digital downsides: exploring university students' negative engagements with digital technology. *Teaching in Higher Education*, 21, 1006-1021.
- Sørensen, B. M. 2014. Facebook fight: why we banned laptops, iPads and smartphones in lectures. *The Conversation*.
- Taneja, A., Fiore, V. & Fischer, B. 2015. Cyber-slacking in the classroom: Potential for digital distraction in the new age. *Computers & Education*, 82, 141-151.
- Wright, J. 2016. Restricting Mobile Device Use in Introductory Philosophy Classrooms. *Teaching Philosophy*, 39, 307-327.