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Teachers' use of textbooks in the digital age

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Abstract: This paper explores teachers' use of textbooks in the digital age. After discussing student expectancies and needs, textbook use and the affordances of modern technology, the paper reports the results of a small-scale pilot study involving eight higher education teachers in Australia who discuss the use of textbooks in higher education in the digital age. The results indicate that textbooks are generally viewed as reliable tools which provide creditable information that supports and enhances students' understanding of critical concepts, and that they present bite-size chunks of information to cement student learning.

Subjects: Classroom Practice; Education Studies; Higher Education

Keywords: textbooks; higher education

1. Today's student in the digital age

Today's student is no different to those of the past, but the technology that they have access to (literally at their fingertips) has changed dramatically. Students today are enabled to multitask, have constant internet access and have become dependent on a continuous flow of information. They want to use their smartphones and tablets to access and store information (Grajek, 2013).

Web 2.0 has had a powerful effect on young people's behaviour where they have a compelling sense of communities of significance (to them at least) linked in their own web spaces, and to a nature of to share and participate with others. It has also led many young people to be impulsive, want immediate access, have the need for immediate responses and to have an unconcerned approach to appraising information. When these behaviours are related to learning, "One must acknowledge that students' study practices *are* changing, and that new media devices and other technologies are heavily involved in the rearrangement of what kinds of studies are done where … The knowledge, activities, relationships and resources involved in student learning are becoming more fluid, and are entering into more complex combinations" (Markauskaite & Goodyear, 2009, p. 615).

ABOUT THE AUTHOR

Bruce Allen Knight is a professor of Education at Central Queensland University. He has extensive teaching experience in primary and special education, and university settings. His research interests are in learning design and pedagogy, and he is a member of the International Association for Research on Textbooks and Educational Media. He has more than 200 publications and worked on large research projects worth more than AUD$5 million from such granting bodies as the Australian Research Council. In 2006, he was honoured with a fellowship of the International Academy of Research in Learning Disabilities.

PUBLIC INTEREST STATEMENT

This paper explores academics use of textbooks in the digital age. After discussing student expectancies and needs, textbook use and the affordances of modern technology, the paper reports the results of a small-scale pilot study involving eight higher education academics in Australia who discuss the use of textbooks in higher education in the digital age. The results indicate that textbooks are generally viewed as reliable tools which provide creditable information that supports and enhances students' understanding of critical concepts, and that they present bite-size chunks of information to cement student learning.

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In the past, students depended on their teachers (who controlled knowledge) and the textbooks they used to access knowledge. However, today "having free access to a wealth of information and content on-line is now expected: being digitally literate today means being able to use appropriate tools to find useful, high quality information in an efficient manner" (Panto & Comas-Quinn, 2013, p. 2). The igeneration, referred to as digital natives (Palfrey & Gasser, 2008), have become skilled at retrieving and manipulating information using technology. From consuming material accessed on the web to producing material and involvement in multi-user shared habitats (Ito, 2010), students have become prosumers (Tapscott, 2009). The students expect to interact and collaborate as creators in the online community, which has implications for the methods and resources used to teach them.

2. Colliding worlds

The world students meet in school has been created on standards that advocate hierarchy, that are conservative, fixed, well defined and deliberate. The student world (using their primary discourse) and the world of school (students using their secondary discourse) essentially coexist for secondary students (and to some extent some primary school students) as student and personal/social identity are disconnected. However, as the nature and use of learning tools is on the cusp of change, so too the world of school will change. At present, students are not demanding transformation, but rather make adaptations in how they respond to complete the task requirements of school and higher education.

3. Learning: constructivism and beyond

Significant trends in learning signify that it is a continuous process occurring in a diversity of ways through communities of practice, individual networks and through finalising activities. Higher education students have always worked in connected ways where they determine the relevance of information, make connections, generate their networks and use their personal agency to locate, evaluate and create information (Fasso, Knight, & Knight, 2013, 2014). Students today still need scaffolding, support and guidance as they engage with textbooks and digital learning resources.

For online higher education learning, I support a sociocultural view of learning that proposes "learning, thinking and motivation are primarily social in nature and have their origins in the social world, in particular in social interactions between people" (Horsley & Walker, 2013, p. 81). As educational activities have more impact when they involve social interaction (Bruner & Haste, 2010), online designs need to create circumstances that facilitate meaningful activities for students' development within a community of social practice.

Social constructivism (Vygotsky, 1978) sustains contemporary learning using the potential of Web 2.0 technology. Social networking technologies influence the cultural practices of learning through online communities. When community members interact and engage using technology to exchange information so as to create personal meaningful knowledge through culturally organised activities, they are actively involved in the learning process.

As technology tools are clearly influencing how knowledge is managed in the digital epoch, connectivism (Siemens, 2004) extends social constructivism by providing an indication of the skills needed by learners to develop and thrive in the digital era. "Know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)" (Siemens, 2004, on-line). The challenge for the learner is to identify relevant information from the digital resources, crack the code and action it by connecting it with other knowledge spheres.

"Connectivism is driven by the understanding that decisions are based on rapidly altering foundations …. The ability to draw distinctions between important and unimportant information is vital" (Siemens, 2004, on-line). Assumptions of connectivism include developing and sustaining connections facilitates learning; that learning may be inherent in technology; and that a succession of knowledge growth supports learners to stay current in their discipline. Connectivist theory (Kop &

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Hill, 2008) suggests that individuals connect to nodes of information that are dispersed across an information network containing both human and non-human nodes of information, thus having relevance to learning in online learning spaces.

4. Use of textbooks

Prescribed textbooks have been frequently used in Education 1.0 to integrate discipline knowledge and support teachers in developing students' learning outcomes (Fasso et al., 2014). A large Australian study of textbook use in higher education institutions reported that almost all courses in Science, Mathematics, Business and Education prescribed a textbook as being essential for student learning (Horsley, Knight, & Huntly, 2010). Students have been encouraged to use textbooks as authoritative sources to do the "heavy lifting" of understanding principles relevant to a discipline (Knight & Horsley, 2013).

Data from commercial Australian publishers for the period 2007–2010 of textbook sales have shown that spending on textbooks across most disciplines has remained constant despite the increasing quantity of digital resources (Knight, 2013; Knight & Horsley, 2013). However, as students increasingly network with voluminous sources of information, teaching needs to move beyond one source of knowledge such as a textbook. A textbook has to be flexible enough to synthesise knowledge and be used as only one element of quality instruction.

The textbook is a critical component of learning design used to facilitate online learning. Murphy, Mahoney, Chen, Mendoza-Diaz, and Yang (2005) proposed a model, which includes the use of a text to guide the development of students' cognitive skills. Similarly, in Salmon's (2002) model to facilitate online teaching, a textbook is essential to aid information exchange and knowledge construction, enabling students to become engaged learners. In the present study, textbooks were defined as structured textual and visual content using a digital format.

Knight and Horsley (2011, 2013) outline a centrality of textbook typology relating to the degree to which teachers and students use textbooks in their courses. Based on an analysis of intended use, four categories consisting of integrated resource, core resource, related resource and peripheral resource have been developed.

In core integration, the textbook provides the scope, sequence and learning activities of the course, with learning management system resources complementing the textbook. When used as a core resource, textbooks play a significant role in the structure of the course with course outlines relating to particular sections of a textbook. The role of textbooks described as related resource provides a wide range of resources to support student learning, with textbooks being one of the resources. Finally, textbooks that provide background reading are described as reference or peripheral resource, and would be regarded as optional.

The typology of textbook use is constructive when exploring the role of the textbook in online learning spaces. Bell, Bush, Nicholson, O'Brien, and Tran (2002) defined the learning spaces in terms of three types based on the extent of dependence on the Internet. Mode A is web supplemented where online participation is optional, Mode B is web-dependent where students interact with content and communicate with learning community participants, and Mode C is fully online where all communication and interactions with resources and assessment are integrated online. In the online learning spaces, textbooks as a resource need to introduce the concepts and knowledge relevant to the discipline, be motivating, and encourage networking and collaboration with other members of the learning community.

5. Textbooks and the affordances of technology

Technology enables more communication and fosters collaboration in many ways at any time where opportunities for idea sharing across classes, geographies, institutions, etc. can be met. There has been a swift pace of informational and technological change with movement from Education 1.0 for

the agricultural age, to the industrial age (Education 2.0), to Education 3.0 building upon the Education 2.0 information locating skills of learners to endorse them as producers of knowledge. There has been a fundamental shift in pedagogy that is personal, networked, and tailored using accessible and openly available content (Keats & Schmidt, 2007). Education 4.0 encourages students to create and produce innovations by networking in learning communities (Fasso et al., 2014). As students can now access virtual classrooms, digital textbooks and a variety of other learning tools online from a multitude of spaces at any time of day or night, the design and management of learning environments is a critically important task (Goodyear, 2010). Teachers need to ensure the learning environment utilises the available technologies.

While technology has impacted student behaviours and distinct preferences for learning, one thing that has not changed is the essential need for credible content. Technology is useless without valid content. Useful educational technologies will be the ones that are built on reliable content using technologies to support students in manipulating the materials and engaging with the teaching.

The selection of resources (e.g. textbook and other sources) is only one aspect of learning design. Other aspects include interactivity (between individuals and technology) promoting students' agency and engagement, e-moderating (supporting learners development of cognitive skills including feedback and general communication), and how the technology and resources are used to impact the learning experiences. This paper focuses on the textbook as a resource.

Textbooks been used to enhance teaching in many varied disciplines at all levels of schooling for many years. When information is transmitted traditionally to the learner through the textbook, the learner is viewed as a passive recipient. Freire (1996) describes this as a banking model "… in which the students are the depositories and the teacher is the depositor" (p. 53).

The advent of Web 2.0 technologies, which enable features such as two-way collaborative communication, content generation, sharing and networking (Keats & Schmidt, 2007), can be used to promote active learning across place and time precincts and a transformation to learner-centeredness. Rather than technology being the driver of teaching, the tools promote learner choice, flexibility and self-direction (McLoughlin & Lee, 2011).

To utilise the capability of Web 2.0 tools and thus interact with digital resources entails a new attitude for participants from consuming to generating resources (Downes, 2006). The collective power of groups can be used to generate information that can be more sophisticated and powerful than individual inputs. Learners are able to participate in the sociocultural practices of a community, and contribute to that community as knowledge creators. Such participation involves students engaging with textbooks and resources in the learning community, as will be explored in the next section of the paper.

6. Engagement

Student engagement has been defined as "active and collaborative learning, participation in challenging academic activities, formative communication with teaching staff, involvement in enriching educational experiences, and feeling legitimated and supported by university learning communities" (Coates, 2007, p. 122). McCrae (2012) contends that using technology for entertainment is very different to the digital literacy skills necessary for engagement in the higher education setting. Students in this environment need to use technology to not only access information but to identify, analyse and evaluate it (Koutropoulos, 2011), so as to "become proficient at creative self-expression, and critical argumentation, in a range of media" (Beetham, McGill, & Littlejohn, 2009, p. 72).

We cannot assume that the mere existence of a textbook, support materials and technology tools will improve the quality of the teaching/learning experience. How students perceive and use the resources represents the key to utilising the full value of textbooks in a digital world. Engagement is

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not all about the learner, but rather the learning community coming together and the resulting networking enhancing learning in a social constructivist tradition.

Knowledge and resource sharing are central to engagement in a vibrant community of practice, defined as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger, 2009). To create an energetic community of practice requires knowledge and resource sharing. Wenger, White, and Smith (2009) developed seven principles for supporting communities of practice to aid in information distribution including: designing to ensure future growth; promoting communication; inviting different levels of participation; developing public and private community spaces; value for participants; combining familiarity and enthusiasm to sustain the community; and creating a "rhythm" for community members (p. 51).

Today's learners exist in a digital age with access to a wide choice of technologies that provide a diversity of interactive resources for information, and communication. A community of practice supports an approach that impels educators to set up activities that encourage learners to search for and create knowledge. For example, engaging students with interactive electronic textbooks can promote experiential learning. Away from a PDF of a traditional textbook, electronic textbooks can feature interactive infographics, and videos to motivate learning. Students can engage with such textbooks, respond, create, negotiate co-construct and share with other members of the learning community.

The Association of American Publishers reported that electronic books (textbooks are a subset of the electronic book format) accounted for 23% of publishing revenue in 2012, enabling the industry to increase revenue by 6% to AUS $6.7 billion. The challenge for authors of textbooks is to provide trustworthy, systematic information that can used by learners to inform their learning (Knight & Horsley, 2013). Using appropriate Web 2.0 technologies leads to development of new networks and communities with personal spaces, group spaces and publishing spaces to be used in teaching and learning. With regard to the pedagogy, critical issues for learning community members are firstly to value all participants' knowledge (which may result in a renegotiation of traditional roles and relationships in the learning process); teach appropriate skills to ensure critical evaluation of information from a wide variety of sources; and to focus on processes not just on content. Such an approach highlights the importance of personal agency issues of control in learning.

The research reported in this paper sets out to explore teachers' thoughts on the use of textbooks in the digital age and catering for twenty-first-century learners. This small-scale research was viewed as a starting point in generating discussion on the use of textbooks in teaching pedagogy and learning online.

7. Methodology

The aim of this project was to gather data from teachers about the use of textbooks in the digital age. The research uses a methodological frame of interpretative ethnography. The data gathering was completed by exploratory interviews with teachers who were responsible for the design of university courses, and also for the selection and provision of teaching and learning resources to support student development.

All teachers were currently using and had used textbooks in their online courses, teaching both undergraduate and graduate students. The teachers all had higher education teaching experience ranging from 5 to 25 years. Discipline expertise of the participants included teacher education and nursing. An email outlining the purpose of the research and requests to participate was sent to 20 teachers of the university situated on two different campuses of a large regional university. Following ethics approval, eight teachers consented to be interviewed.

The questions for the interviews were generated from the literature to elicit aspects about course design and the resources supporting this design. The questions intended to identify participants'

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beliefs about the role of textbooks, the features important for students' courses. Interviews were approximately 15 min in duration and individual responses were aggregated, analysed and presented as themes emerging from the data.

8. Results and discussion

8.1. Role of a textbook

Textbooks were generally referred to as a reliable tool to use that supports lecture notes and provides deeper understandings of critical concepts, thus broadening students' understanding. Responses included using it as "following up on lectures and concepts"; "providing basic knowledge, concepts and skills" [3 responses]; and "essential pre-reading to provide content knowledge throughout the course". One respondent indicated that she did not use it as an organiser for the course but rather as a "broad resource".

Participants in this study did not view the textbook as a closed product, but rather suggested that it can be used as a basis for essential authoritative knowledge for the disciplinary community of practice. Specific responses indicated that the textbook was viewed as a "source of credible information", "one consolidated reference source" and "useful to coordinate the basic focus of a course". One respondent suggested that textbooks are also useful in the assessment process "as they give students reliable information".

8.2. Use of textbooks

As outlined above, Knight and Horsley (2011) developed a centrality of textbook typology relating to the degree to which teachers use textbooks in their courses. Participants' responses were analysed using the typology. Responses suggested that participants' use of textbooks was dependent on the discipline, the student [undergraduate or postgraduate] and level of knowledge (e.g. first-year and final-year student). Based on an analysis of intended use, the range of uses respondents suggested included use as a core resource [4], integrated resource [3] with textbooks "essential for pre-readings and workshop activities" and as a related resource "because it does not relate directly to practice which some of my subjects need". No respondent indicated that textbooks were used only as a peripheral resource.

Interestingly, participants indicated that (from their experiences) undergraduate students rarely purchase textbooks after their first year, even when it is used as an integrated resource where "weekly readings of the course are linked directly to the textbook—students just don't do it". Another participant added that "undergrad students still tend to print out all resources to read in hard copy". This finding was also commented on by another participant when she stated that "the textbook I used this year in a postgraduate course [with only 14 students] was available in hard copy and as an ebook with half of the students buying hard copy [so they didn't have to print] and the other half an ebook". Similar findings have been reported by Zucker (2012) indicating that students who preferred the electronic versions of textbooks found it easier to navigate digital content and simpler to satisfy teacher expectations and participation in class activities. Other students however are not comfortable with navigating and working in an online space.

8.3. Features of electronic textbooks

Respondents indicated that electronic textbooks required features which "cement learning and declarative knowledge". Features considered useful included "discussion and reflective questions[3]; key terms and definitions [the language of the discipline]; case studies; examples; vignettes; summaries; self-assessment activities; quizzes; and animation images". It was noted that it was important that media for textbooks to link should have no boundaries and include such things as *videoclips* [8 responses], *youtube* [5], *blogs* [3], *scenarios, web resources, forums, podcasts, 360 images* and *3D graphic animations.* It was reported that the availability of interactive resources "helps cater for a wide range of abilities in the class and engage students in learning". It was also noted that "bite size

chunks and presentation of information is critically important with short explanations and application to case study very important".

Significantly, one respondent suggested that "tutors need to learn how to incorporate features into their teaching and program design", a finding supported by Grajek (2013) who reported that teachers struggle to find both time and support to proficiently use electronic textbooks and their advanced functionality in their teaching. Another respondent indicated that unless the features were directly linked to and built into assessment activities, "students won't respond".

8.4. Create your own electronic textbook

Technology advances now make it much easier than in the past for teachers to create their own textbooks. Open learning networks can support teachers to produce their own subject matter and distribute it online, bypassing more traditional publishing networks. In addition, publishers now offer opportunities for teachers to create their own textbooks using diverse published resources. Respondents indicated that creating their own textbooks was a possibility, but "it depends on the topic and discipline" and "I will definitely consider it in the future". Others suggested that they had done this in the past but "it can be disjointed [as the participant was not sure of the quality of different authors sometimes]"; another preferred a textbook "from key researchers in the discipline", and it was not feasible in one discipline because "I need to search a very broad base".

8.5. Pedagogy

Participants were asked their opinion about the use of the textbook when teaching online and face to face. The pedagogy was influenced by the number of students participating in the subject as well as the nature of the subject influencing how it is taught. Textbooks were generally considered to provide a teaching framework but "textbooks are just a tool—the practice of using it [pedagogy] is more important", a finding supported by both students and teachers in a large trial of 5,000 US students in 393 courses using electronic textbooks (Grajek, 2013).

Three participants indicated that there is no difference in the way they teach online and internal classes. Interesting comments included that with online courses, "there is a need for more organisation and direction and the textbook is particularly helpful for this"; and "on-line students read and engage more from my experience and they don't rely on my lecture notes".

One participant preferred face-to-face classes as "I am training my students for a people industry and they need to be able to relate to people". In these classes, "students are forced to interact and engage in discussions because I don't know if they are engaging in the process".

One issue discussed by a participant as relating to pedagogy was the need for students to be engaged in curating information. It was suggested that students need to be digitally literate and critically analyse available information when establishing the influence and reliability of information available online.

8.6. Textbooks in the digital age

Finally, participants were invited to comment on the use of textbooks in the digital age. The majority of responses in this study suggested that there would be a place as textbooks provide content knowledge which is a "starting point to launch into study", and "there is a lot of rubbish out there [on the web]". The textbook authors were considered "key researchers in a discipline or field of study" and the textbooks make "what is read more meaningful; the conceptual thinking is linear"; and "textbooks make it simpler to scope out what to teach" [it sets boundaries, thus making it easier to teach]. One participant, however, suggested that textbooks would not be necessary as "there will be other interactive on-line resources [as a place for support materials]".

9. Conclusion

Technological advances enable a new way for learners to access and use textbooks. Online and digital materials allow for easy access to a wide variety of resources. With the digitisation of materials, we need to avoid what Ellis and Goodyear (2010) refer to as the "bolt-on effect". What is important is to concentrate on the development of students' understanding using the power of learning technologies, not just using digitisation as a means for conveying information in text form by bolting it on to existing course design.

The current study is limited in a number of ways. Firstly, data were gathered from a small number of participants in specific disciplines who reported their personal beliefs and experiences. Secondly, the participants were part of a convenience sample and therefore may have been different from other teachers in different disciplines in this and other higher education institutions. Further research is needed.

Whilst not making any attempt to extrapolate findings from this study, the results of this small study suggested that participants believed that textbooks have an authoritative voice and provide direction for students' learning. Even though all interviewees were in the education and nursing fields, it seems to make a difference which subject is taught within the discipline, for example, educational psychology being different to general education and different again to pedagogical practice. Other findings requiring further research include investigating both undergraduate and postgraduate textbook use and the effect of the use of textbooks when large numbers of students are enrolled in courses, as electronic textbooks have the potential to transform the delivery of learning resources and personalise learning. The differing side of these developments is the need for teachers to engage students by developing innovative pedagogies which utilize textbooks and other resources.

In conclusion, Sharples et al. (2012, p. 6), advocate that online learning signifies "a new and disruptive form of education that transcends boundaries between formal and informal settings, institutional and self-directed learning, and traditional education providers and commercial organisations". It has been proposed by Chesser (2012, p. 28) that ultimately the shape of an electronic textbook in this disruptive paradigm will be a "self-generating, self-sustaining, crowd-sourced, open access wiki book, changing constantly, developed by everyone and owned by no-one". I look forward to working in such a space.

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Appendix A Knight (2013)

Interview Questions

Demographic Data
How many years do you have of university teaching experience?
What is your discipline expertise?

Interview Questions

(1) Do you use textbooks in your online courses?

(2) What is the role of a textbook?

(3) How do you use textbooks to teach online? (Integrated, Core Resource, Related, Periphery)?

(4) What resources/features (e.g. tests, readings and support materials) do you want your electronic textbooks to have?

(5) Should textbooks encourage users to interact and generate content? Why/why not?

(6) What media would you like textbooks to link to?

(7) Are you more likely to pick and choose to create your own electronic textbook?

(8) Does it make a difference to pedagogy and the use of textbooks if the course is face to face or online? Why/why not?

(9) Do you think textbooks will survive in the digital age? Why/why not?

(10) Would you like to make any general comments on the use of textbooks in the digital age?

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