

# Teaching in context: Some implications for e-learning design



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One of the major advantages of e-learning technologies is the expanded opportunities that they offer for when and where learning takes place. Until recently, little attention has been given to the implications that variation in the learner's context creates for e-learning design. The context of learning with technologies is often considered quite narrowly, sometimes at the level of specific learning transactions, with limited acknowledgement of whether learners will be engaging with them on-campus, off-campus, across national boundaries or in some other contexts. While there are limitations to teachers' control of contextual variation, their knowledge of the student cohorts to whom a particular unit of study will be offered provides some clear implications for choices to be made in relation to e-learning design. This paper illustrates these choices through the use of examples from e-learning showcase sites at two institutions. The examples are analysed within a selected theoretical framework to provide preliminary guidelines for accommodating contextual variation in e-learning.

Keywords: e-learning design; context; transactional distance

## Introduction

The context of learning is a crucial factor to consider in designing electronic learning environments, and it is a dynamic which is frequently not fully analysed. While there may be detailed contextual analysis at the level of the specific e-learning transaction, the context of the student who will be engaging with it, the context of the teacher who will be supporting it, and the institutional infrastructure which will be underpinning it, may not be considered with the same level of detail. We suggest that there are major contextual issues that need to be considered, for example, when comparing an e-learning component designed for use in a lecture theatre or computer laboratory, compared to a similar component designed for use at home by off-campus students, or for use in a classroom in another country.

In this paper we present an approach to addressing some broad choices about the design of e-learning by considering the context of learning and teaching. We illustrate this approach through the use of selected examples from e-learning showcase sites at Monash University and Deakin University, Australia. This approach provides a framework within which a more detailed analysis of context could occur.

## The context of learning and teaching

The importance of context to the experience of learning has been acknowledged from a number of points of view. Context is a complex, multifaceted, perspective-dependent concept which may include a range of factors in its definition, from the specific characteristics of the learning and teaching environment, to disciplinary, institutional and systemic variables, and beyond that to broad social influences and personal issues affecting students' lives. Along with learner characteristics, context is frequently one of the first variables to be considered in learning design (Ramsden, 2005). From perspectives associated with phenomenography and the student learning research movement in higher education, learning is about the qualitatively different ways in which people experience, conceptualise, perceive and understand the world around them (Marton, 1981). The student's reality is seen as being inextricably part of the context of their learning experience and requires the teacher to endeavour to see the world through the learner's eyes. In contrast, from a constructivist perspective, the world is seen as being separate from the student (Marton & Booth, 1997). From this viewpoint, the best way of achieving the construction of meaning that is involved in learning is through contextualised real world tasks which provide for improved understanding and more consistent transfer to new situations. This involves situating learning experiences in an authentic context and designing for cognitive flexibility to allow students to deal with 'the real world complexity

and ill-structuredness of many knowledge domains' (Spiro, Feltovich, Jacobson, & Coulson, 1991, p. 24). The concept of social constructivism (Vygotsky, 1978) adds important social dimensions to consider in e-learning designs which accommodate the context of learning.

From a social theory perspective, learning is seen within the broader context of students' lives, including social, political, economic and cultural influences. At a personal level, issues related to race, ethnicity, gender and sexual orientation, social and educational background, money, power, work or age may form part of the context of learning. From an experiential learning viewpoint, learning may be seen as a function of the relationship between learners and the learning milieu with the learner's personal foundation of experience, the learner's intent, and the learning milieu forming 'a network or nexus of cultural, social, institutional and psychological variables' (Boud & Walker, 1991, p.17).

The nature of the teaching institution also imposes powerful contextual influences on learning, particularly in relation to policies, infrastructure, systems and procedures which impact directly on student support. Ramsden (2005) has noted the contextual implications related to teaching within academic departments. Each teacher's contextual influences and conceptions of learning affect the learning context that they design for their students. E-learning opportunities present a range of further contextual variables which include access issues, the skills and responses of staff and students in relation to use of various technologies, and the fact that they allow teaching and learning to occur across an infinite variety of locations, from the on-campus classroom to remote sites in other countries, where students in a range of contexts may be in the same 'class'.

Kirkwood (1995, 2000) illustrated the importance of context in the experience of distance learning by focusing on the factors affecting home-based learning. There are implications for this kind of analysis in relation to online learning across many contexts (including work-based learning, field work and mobile learning) because the technology introduces an element of distance which is not present in on-campus teaching. While it is impossible for the individual teacher to address many of the contextual issues present in online teaching, in the following section we suggest one approach to analysing some broad aspects of the learning context so that they can be considered as part of the learning design. We then illustrate this process through analysis of selected e-learning showcase examples.

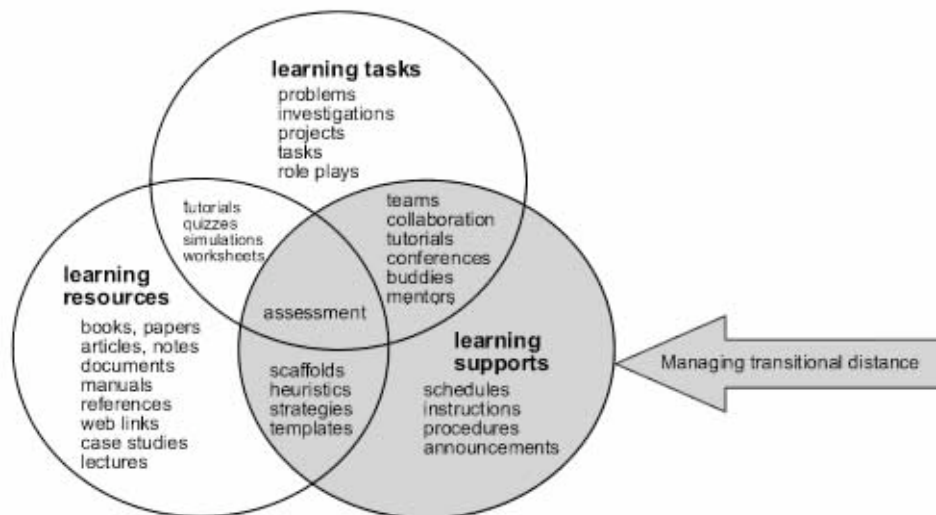
## **An approach to addressing context as part of learning design**

We present this approach using the model of learning design proposed by Oliver and Herrington (2001). According to this model, appropriate learning supports assist and navigate the learner through the activities and resources of an online learning environment. The nature of the learning supports required may be seen to be contingent on the characteristics of the learners and the learners' context. According to Oliver and Herrington (2001, p.55), these supports provide 'the processes and procedures by which learners are assisted in their learning activities, by which feedback and guidance is provided to them and by which their involvement in the learning setting is encouraged and strengthened.' Depending on the need, these supports may include learning guides, model answers, web-based templates, learning schedules, library support, and academic counselling as provided in some wholly online learning environments. For example, learners in wholly online transnational contexts may need additional and different supports compared to learners in blended learning contexts. We use Moore's theory of transactional distance (Moore, 1980) to analyse the learning and teaching context and consider the implications for the learning supports that need to be provided as part of the learning design because it offers a simple way of conceptualising management of some key variables which influence learning and are within the teacher's control.

According to Moore, transactional distance is the psychological space between the learner and the teacher and it is more significant than geographical distance in planning the design of learning. Transactional distance is relative and is influenced by three variables: dialogue, structure and learner autonomy (Moore & Kearsley, 2005). Moore (1991) defined dialogue (D) as the interaction between teacher and learner, which leads to improved understanding and promotes learning. Structure (S) refers to the composition of the elements of the course design, such as learning objectives, presentations, case studies, exercises and tests (Moore and Kearsley, 2005). High levels of structure, combined with limited opportunity for dialogue, suggest high transactional distance between the learner and teacher. Dialogue and transactional distance are inversely related and as dialogue increases and learners receive ongoing guidance through communication, transactional distance decreases. High structure (+S) and limited opportunity for dialogue (-D) do not allow learners to negotiate content and explore individual learning needs and outcomes. Dialogue provides an opportunity for clarification as well as promoting a more participatory approach to learning. The third variable, learner autonomy (A), is less easily described and may include

psychological or educational autonomy (Garrison, 2000). It reflects learners' ability to have a 'voice' and make choices. It is related to their capacity to learn independently, combined with sufficient course flexibility to allow them to negotiate learning outcomes and make decisions about their individual learning. Moore (2004) argues that the right balance between structure and dialogue is dependent on the educational sophistication of the learner and the subject content.

Moore makes no value judgements about either structure or dialogue. They each have their value in different learning contexts. According to Kanuka, Collett and Caswell (2002), both high and low transactional distance are acceptable, depending on learners' characteristics and their level of autonomy. Therefore, the teacher's understanding of the learners and of the complexities related to management of learner autonomy, dialogue and structure, plays a significant part in effective e-learning designs. As indicated earlier, we consider that this primarily influences the supports that need to be provided in specific contexts, which may, in turn, influence the design of learning activities, learning resources and assessments, as illustrated in Figure 1.



**Figure 1: Including management of transactional distance as a factor in e-learning design (based on Oliver & Herrington, 2001)**

The idea of transactional distance has its origins in explaining the variables that need to be considered in accommodating the separation between learners, and between teacher and learners, in distance teaching, although it is relevant to any teaching situation (Rumble, 1986). During the 1990s some studies empirically confirmed concepts associated with transactional distance in relation to synchronous electronic interaction (e.g., Bischoff, Bisconer, Kooker & Woods, 1996; Bunker, Gayol, Nti & Reidell, 1996; Saba & Shearer, 1994), though limitations (such as the inability to explain process and predict events or to correlate transactional distance with learning outcomes) have been noted by Cookson and Chang (1995), Chen and Willits (1998), Chen (2001a; 2001b) and Gorsky and Caspi (2005a).

A series of studies has focused on the role of interaction in transactional distance. Moore (1989) identified three forms of transactional interaction: learner-instructor interaction; learner-content interaction and learner-learner interaction, to which Hillman, Willis and Gunawardena (1994) added learner-interface interaction to accommodate the characteristics of the electronic classroom. Subsequently, the effects of these four variables on web-based learning have been examined in studies by Chen (2001a; 2001b), Zhang (2003) and Lemone (2005). Zhang found that the strongest factor that affected students' transactional distance and engagement with learning was the transactional distance between student and students, followed by transactional distance between student and teacher. Lemone demonstrated how different cultural influences affected transactional issues relating to these four variables in a study involving Nepali and Icelandic students.

Moore's definition of dialogue as interaction between teacher and learner, distinguishes it from the other forms of interaction (Moore, 1991; 1993). It is dialogue (not interaction), which he used to hypothesise about the inverse relationship with structure (course design) in relation to transactional distance. Dron, Seidel and Litten (2004) have illustrated the inverse relationship between dialogue and structure in a blended learning environment. Dron (2005; 2006) has also introduced other ideas relating to transactional distance and e-learning, in particular by analysing dialogue and structure in terms of transactional control, commenting that '[s]tructure equates to teacher control, dialogue to negotiated control, and autonomy to

learner control' (2006, p.41). He notes that transactional control is concerned with choices, either by teacher or learners, and he examines the control issues which emerge in the use of social software, including the potential for structure to arise as a result of dialogue. Consequently, he has also noted a paradoxical element to the 'law' of transactional distance in virtual learning environments when structure is generated through dialogue to create an environment which has both high structure and high dialogue at the same time (Dron, 2004; 2005). However, Moore (1977) in his earlier work had already acknowledged the possibility of both high dialogue and high structure (+D+S) (using correspondence programs as an example), and of low dialogue and low structure (-D-S) (illustrated by self-directed independent study programs). Moore (1993) noted that high structure and high dialogue could reduce transactional distance and he suggests that instructors in doubt should err on the side of too much structure rather than too little (Moore, 2004). The central role of structure (course design) in student satisfaction and perceived learning in online learning environments has been supported by Shea, Pickett and Pelz (2003) and Stein, Wanstreet, Calvin, Overtoom and Wheaton (2005).

Our analysis of the examples which we present in the following section has indicated that consideration of the context of online learning, along with the expected level of student autonomy (A), may suggest which of the dialogue-structure combinations (+D+S, +D-S, -D+S, -D-S) is appropriate in a given situation to minimise transactional distance and thereby offer an indication of the learning supports that need to be provided. Consequently, we use a two-by-two matrix to consider the relationship between dialogue and structure, rather than the idea of a continuum or cluster (Garrison, 2000). As part of this we recognise the importance of structuring dialogue itself in some contexts, particularly in cases of high transactional distance. In addition, we have regarded provision for learner-content interaction and learner-interface interaction as elements of structure and have focused on dialogue as communication between learners or between teacher and learners. This is supported by the idea of structure as including activities with automatic feedback that is programmed in advance, thereby contributing to intrapersonal dialogue, as opposed to interpersonal dialogue which is characterised by open-ended social and emotional engagement with other people (Gorsky & Caspi, 2005b).

## Analysis of examples using the above approach

Table 1 summarises the examples we selected for consideration. We used these examples because they had previously been judged as suitable for inclusion in showcases of effective teaching and therefore, implicitly, they could be expected to include appropriate characteristics for managing transactional distance. The showcases are Monash University's *Designing Electronic Learning and Teaching Approaches (DELTA) for the Health Professions* (a faculty-level password protected site) and Deakin University's *Contemporary Online Teaching Cases* (available at <http://www.deakin.edu.au/itl/teach-learn/cases/index.htm>).

The learning and teaching contexts covered by these examples range from classrooms, to partially and fully online environments which extend to transnational settings. Technology supported face-to-face teaching is a common approach where teaching primarily takes place in an on-campus classroom setting with some resources provided electronically as an enhancement (Example 1). The two examples illustrating blended settings (Examples 2 and 3) have reduced face-to-face sessions and a combination of online and other media, with the related dialogue managed either in the classroom setting or in the online environment. In the two wholly online examples (Examples 4 and 5), all activities related to teaching, learning and assessment submission are carried out online. Participants receive one piece of paper in the mail which gives them the URL to the site, username and password. The partially online example (Example 6) is a hybrid combination of learning components designed for off-campus and transnational settings.

*Example 1 – on-campus (classroom-enhanced) (-D-S+A):* This example is used in class to help students develop counselling skills. Hence, no online dialogue is required (as dialogue occurs face-to-face). DVDs consisting of video vignettes form part of the learning resources and their use is determined by the face-to-face setting. The DVDs have a basic linear structure but vignettes can be selected in any order to allow flexible use to meet the needs of specific situations, including the higher autonomy levels of postgraduate students.

*Example 2 - on-campus (blended) (-D+S-A):* Here the contextual impetus for the online component relates to staff logistical considerations in running practical classes. Transactional distance is minimised (and support is maximised) because dialogue and instructions are available from the accompanying on-campus arrangements. The high level of structure in the online material is expected to suit second year undergraduate students who might demonstrate low levels of autonomy.

**Table 1: Characteristics of transactional distance in selected learning contexts**

1. On-campus (classroom enhanced) (-D-S+A)	
Unit information	EDF6501 Counselling Psychology: Theories and Practice and EDF6503 Ethical Clinical and Professional Practice in Counselling Psychology (Master of Psychology (Counselling), Monas)
Context details	<ul style="list-style-type: none"> <li>DVDs of video vignettes of 'clients' representing challenging situations faced by counselling psychologists to help students practise, reflect on and evaluate their own counselling skills</li> <li>Vignettes viewed in class, followed by written responses and small group discussion</li> </ul>
Learner details	<ul style="list-style-type: none"> <li>Postgraduate students</li> </ul>
Online dialogue	<ul style="list-style-type: none"> <li>Nil (but discussion occurs in class, as above)</li> </ul>
Electronic structure	<ul style="list-style-type: none"> <li>Individual vignettes selected from linear structure to meet individual training needs</li> </ul>
2. On-campus (blended) (-D+S-A)	
Unit information	VCP2031 Pharmaceutics 1 (Bachelor of Pharmacy, Monash University)
Context details	<ul style="list-style-type: none"> <li>Weekly lecture + tutorial + online practical class</li> <li>Weekly online practical classes on tablet making designed as a self-directed mandatory learning session in the on-campus computer laboratory</li> </ul>
Learner details	<ul style="list-style-type: none"> <li>200 undergraduate students</li> </ul>
Online dialogue	<ul style="list-style-type: none"> <li>Nil (but discussion occurs in the tutorials, as above)</li> </ul>
Online structure	<ul style="list-style-type: none"> <li>Video demonstration with lecture material and online quizzes</li> </ul>
3. Workplace-based (blended) (+D-S+A) <a href="http://www.deakin.edu.au/itl/teach-learn/cases/files/participants/monaghan.htm">www.deakin.edu.au/itl/teach-learn/cases/files/participants/monaghan.htm</a>	
Unit information	ALR382 Internship (Bachelor of Arts, Deakin University)
Context details	<ul style="list-style-type: none"> <li>Mandatory work placement organised for all students through the Faculty office</li> <li>Work placement served in different companies around Victoria, Australia and the world</li> </ul>
Learner details	Final year Public Relations students
Online dialogue	<ul style="list-style-type: none"> <li>Online discussion forum</li> <li>Online journal (e-journal feature on unit site), blogs</li> </ul>
Online structure	<ul style="list-style-type: none"> <li>Online unit outline</li> <li>Online submission of two assignments and one work report on how students connected theory to practice during internship</li> </ul>
4. On-campus: multiple campuses (wholly online) (+D-S+A) <a href="http://www.deakin.edu.au/itl/teach-learn/cases/files/participants/walsh.htm">www.deakin.edu.au/itl/teach-learn/cases/files/participants/walsh.htm</a>	
Unit information	EEE712 The Strategic Academic (Graduate Certificate in Higher Education, Deakin University)
Context details	<ul style="list-style-type: none"> <li>Mandatory course for all new academics; must be completed during probationary period</li> <li>Optional face-to-face workshop at start of course</li> </ul>
Learner details	<ul style="list-style-type: none"> <li>Postgraduate students, all university teachers at Deakin University</li> <li>Requires complete autonomy of learner</li> <li>Individual career objectives matched with unit objectives to negotiate assignment which is the learner's strategic plan as an academic</li> </ul>
Online dialogue	<ul style="list-style-type: none"> <li>Students negotiate and shape final assignment to suit individual goals as lecturers</li> </ul>
Online structure	<ul style="list-style-type: none"> <li>Unit outline</li> <li>Deadlines provided on the unit site</li> </ul>
5. Off-campus + transnational (wholly online) (+D+S-A) <a href="http://www.deakin.edu.au/itl/teach-learn/cases/files/participants/coldwell.htm#">www.deakin.edu.au/itl/teach-learn/cases/files/participants/coldwell.htm#</a>	
Unit information	SCC306 Computers and Society and Professional Ethics (Bachelor of Information Technology, Deakin University)
Context details	<ul style="list-style-type: none"> <li>Core unit with compulsory final examination</li> <li>No print materials; all learning resources provided in the online environment</li> <li>Students must progress through specified tasks and activities</li> <li>Assignments submitted online</li> </ul>
Learner details	<ul style="list-style-type: none"> <li>500 third year undergraduate students from rural and urban Australia and overseas</li> </ul>
Online dialogue	<ul style="list-style-type: none"> <li>General discussion forum on unit site (forum open throughout semester)</li> <li>Online discussion forum for each separate task (forum locked for posts after stipulated task completion date)</li> <li>Wikis for group work; participation mandatory for group functioning</li> </ul>
Online structure	<ul style="list-style-type: none"> <li>Highly structured around a series of tasks supported by online tutorials and dedicated discussion forum for each week's activity</li> <li>All activities structured uniformly and must be completed within the given week</li> </ul>
6. Off-campus + transnational (partially online) (+D+S+A)	
Unit information	SWM5220 Social Work and Aged Care (Master of Social Work, Monash University)
Context details	<ul style="list-style-type: none"> <li>Unit site includes structured activities introduced in print material + visual and aural resources</li> <li>Integrated with print materials and accompanying DVD of video interviews with elderly people</li> </ul>
Learner details	<ul style="list-style-type: none"> <li>Postgraduate Australian and international students; all practising social workers</li> </ul>
Online dialogue	<ul style="list-style-type: none"> <li>Structured discussion activities form 80 percent of assessment</li> <li>Students draw on their experience from their own contexts to contribute to knowledge and share understandings</li> </ul>
Online structure	<ul style="list-style-type: none"> <li>Highly structured activities and media integration</li> </ul>

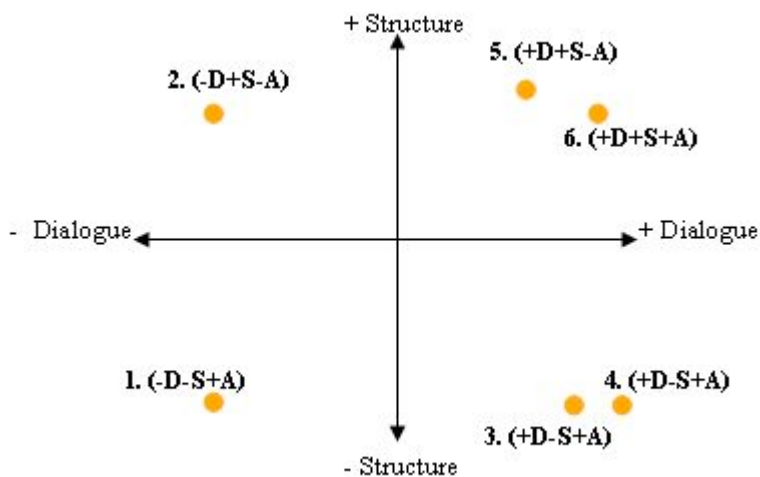
*Example 3 - workplace-based (blended) (+D-S+A):* Here transactional distance is managed through a high level of online dialogue to support learning in the workplace setting which suits the high autonomy of the final year learners who are already operating in professional contexts. Only minimal online structure is provided. (Information in Table 1 has been drawn from both the showcase site as well as the unit website.)

*Example 4 - on-campus: multiple campuses (wholly online) (+D-S+A):* This unit provides learners with structured and non-structured pathway alternatives. Table 1 refers to the non-structured pathway where learners make their individual course goals and expectations explicit to the teacher and individually negotiate the assignment and course outcomes. This highly autonomous group of learners who identify their own learning needs and outcomes, works with the teacher to develop their measures for success and conduct this negotiation in an online environment.

*Example 5 - off-campus + transnational (wholly online) (+D+S-A):* This wholly online unit with a large number of urban, rural and international students has potentially very high transactional distance which is addressed through high levels of both dialogue and structure. Autonomy is low as a result of the very high structure used to manage the large off-campus and transnational cohort.

*Example 6 - Off-campus + transnational (partially online) (+D+S+A):* Although the transactional distance in this example might appear to be lower than in Example 5 because of the smaller number of students studying at postgraduate level, it is nevertheless addressed through high levels of both dialogue and structure to maximise support of the diverse learners.

The pattern which emerges in this small sample indicates that a classroom can support low dialogue and low structure (-D-S) in the online components used because the face-to-face context provides for low transactional distance. However, once a blended learning environment is introduced, an inverse relationship between structure and dialogue is evident, though the specific aspects of it will depend on the context and on the autonomy of the learners. As transactional distance becomes potentially greater in off-campus and/or transnational units which are wholly or partly online there appear to be benefits in both high dialogue and high structure (+D+S) to meet learners' needs. Figure 2 maps the relative levels of dialogue (D), structure (S) and autonomy (A) of the examples in Table 1.



**Figure 2: Relative levels of dialogue, structure and autonomy in the selected learning contexts**

In the next section we consider some implications for e-learning design which emerge from this analysis.

## Implications for e-learning design

The above examples illustrate how basic knowledge about the learning context can guide choices to reduce transactional distance by influencing the design of learning. Using this approach, decisions about the learning supports required will involve balancing structure and dialogue based on knowledge of learner characteristics (particularly learner autonomy) and the learning context. For example, wholly online learners in the early years of a course might be expected to have low levels of autonomy and require high levels of structure in order to bridge the transactional distance. This might involve structured online tasks (to facilitate intrapersonal dialogue) which are completed in specified timeframes, and



plentiful guidance through strategies such as scaffolding. When learning activities require interpersonal dialogue, this may also need to be structured by the teacher, perhaps using Salmon's (2003) e-moderation model, with a lot of support provided early in a semester or course so that more complicated discussion tasks are introduced when students have moved to a stage where they are able to interact comfortably in an online environment and are able to accommodate more complex discourse. In contrast, more mature learners with higher levels of autonomy may be able to manage their own learning easily, with little support and may readily form online communities of practice, where much of the dialogue involves social construction of knowledge through learner-learner interaction. Use of social software such as blogs and wikis can empower learners and provide greater learner control through learner-learner interaction. When learners use the shared online space to build their learning environment collaboratively in a wiki, the choice made by the teacher to delegate control to the students, in turn increases the students' choices within that context, and their ability to manage structure and dialogue.

As indicated in Examples 1-3, access to a face-to-face learning context tends to reduce transactional distance, and structure and dialogue are determined and matched according to the specific contextual requirements, considered in relation to the expected levels of learner autonomy. In practice, this suggests that limited attention to design can be accommodated in a classroom-enhanced context (Example 1) because other environmental factors are available to compensate for this. However, in Examples 2 and 3, the nature of the blended learning environment will determine whether the design focus needs to be on dialogue or structure. In Examples 4 to 6 there is no face-to-face contact but high levels of online dialogue reduce transactional distance. In Examples 5 and 6 high levels of structure accommodate diverse student groups. Practical implications to consider in designing high dialogue environments to counter high transactional distance include the ongoing involvement of teachers and sensitivity to learner needs in order to design for appropriate learner autonomy. Where high structure is implicated, an upfront investment in planning and time is required as well. Even where considerable control in structure or dialogue is delegated to the learner, there are implications for very careful planning, management and evaluation by the teacher to establish requirements and monitor progress to ensure that learning outcomes are met. It would be interesting to identify successful cases where high transactional distance exists without high levels of structure: it seems likely that very high levels of learner autonomy would be needed, and perhaps small student numbers, in order to accommodate student diversity.

The ability to make further choices about appropriate e-learning design will be enhanced as knowledge of the students' learning contexts increases. Thus, adopting a social theory perspective and considering the broader context of students' lives will provide additional implications for the supports to be provided and the appropriate balance of structure and dialogue. This may also affect the resources used, the design of the learning tasks and the corresponding assessment. This perspective also has implications in terms of power and control: a focus on the emancipatory and transformative potential of learning associated with a social theory perspective will underpin decisions about how learner support and control are to be managed to promote the empowerment of learners.

Similarly, consideration of the learning context from other theoretical perspectives will influence the choices made about e-learning design. If the teacher is committed to a view of learning associated with phenomenography or the student learning research movement in higher education, then there will be a natural inclination toward designing learning opportunities from the student's perspective, which will allow them to engage with their own worlds in ways which demonstrate high quality, well-structured, complex outcomes. If there is a commitment to supporting the characteristics of adult learners, then understanding learning from an experiential perspective and accommodating the learners in the context of their experience and social milieu will be readily acknowledged. From a constructivist perspective, contextualised real world tasks will be an integral part of the design. If context is to be fully recognised, it is important that these tasks reflect the 'real world' of the specific learners studying the unit. From a social constructivist perspective, the dialogue which allows students to construct meaning, create learning communities and support each other, concurrently reduces transactional distance.

There are clearly multiple ways in which the role of context in e-learning design can be viewed, and within the perspective used, there are multiple aspects of the context which can be considered to inform choices about e-learning design. As the increased reach of web-based learning and teaching results in a greater diversity of students, with a corresponding increase in the expected transactional distance, the challenge of accommodating the context of learning becomes more complex and more urgent. Where learner autonomy is expected to be high, there are further design choices to be made about the extent of control (and choice) to be delegated to the learners, particularly given the capacities of some of the social software now available. Mobile devices, offering flexible, anytime-anywhere learning, add new

contextual dimensions, suggesting a learning design that accommodates the competing demands associated with mobility. The context of learning impacts on all these learning design decisions.

## Discussion and conclusion

In this paper we have aimed to illustrate the importance of considering the context of learning and teaching when making choices to inform e-learning design. We have suggested that one way to analyse the design implications of the teaching context is to use the concept of transactional distance to balance the level of structure, dialogue, learner control and teacher responsibility which is appropriate to the expected autonomy of the learners. Structure needs to be tailored to the level of the learner and match the learners' needs as well as expectations. Given that online environments lend themselves to high dialogue and high structure (+D+S), and to the ability to build structure through dialogue (and dialogue through structure), it is imperative to consider the likely autonomy of the learner to identify appropriate supports. The potential to use effectively some of the capacities of the new technologies, and delegate appropriate levels of choice and control to the learner, is dependent on this understanding. It is the teacher's responsibility to design appropriately for the given learning context to ensure that the required learning outcomes can be met.

The concept of transactional distance is not measurable and there is no formula on how much structure or how much dialogue is necessary for learning to be effective in a given learning context. However, analysis of the examples included in this paper suggests that there is likely to be a pattern in the levels of dialogue and structure which suit some common teaching contexts. This pattern could be explored further by applying the theory across a greater range of examples within the contextual categories considered in this paper, and by analysing the impact of further information based on more detailed knowledge of the learning contexts of specific student cohorts. Additional information from both these sources may provide useful insights for e-learning design. Although, from a scientific perspective, the theory of transactional distance is open to critique (Gorsky & Caspi, 2005a), it gives a credible philosophical explanation to the dialogue-structure interrelationship which good e-learning designs need to balance through learning supports that are appropriate to the autonomy of the learner and the learning and teaching context.

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