Cultural Dimensions of Learning in Online Teacher Education Courses

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Abstract

Aotearoa New Zealand's demographics are changing rapidly and, as a consequence, there is now greater diversity in the tertiary student population. This diversity is evident in the continuing growth of Māori and Pasifika student participation. Teacher education is increasingly emphasising social competencies and intercultural awareness. Online pedagogies based on sociocultural methods require openness to difference, understanding, and sharing; but it is a challenge to support productive learning communities that span diverse cultural backgrounds. This study began with a literature review, and then the eight dimensions in the cultural dimensions of learning framework (CDLF; Parrish & Linder-VanBerschot, 2010) survey were modified for use with online courses. The modified survey was trialled with 112 students and four lecturers in 11 online teacher education courses offered by a New Zealand university. Although respondents exhibited a wide range of choice in the survey, the participants were not sufficiently diverse to reveal any differences that might be attributed to culture. It was concluded that the CDLF could provide a useful stimulus to promote discussion amongst learners and teachers and that this discussion could raise awareness of the diversity of approaches to learning that could have a cultural basis. However, the lack of attention to indigenous worldviews and the limited evidence of reliability in the CDLF scales suggest that further empirical research of this survey instrument is unlikely to be worthwhile.

Keywords: distance education; electronic learning; online learning; pedagogy; multicultural education; culture; ethnicity; learning preferences

Introduction

This paper arises from the desire of the curriculum design and development group in a New Zealand Faculty of Education to better understand the learning needs of our increasingly diverse student population, and to give them more appropriate online experiences. A literature search was conducted, and an initial study was set up to investigate one approach that emerged from that literature. The paper describes issues that were identified from the literature review, and findings from a trial survey that aimed to identify links between learning preference and cultural orientation.

Although culture is crucial to this paper, culture itself remains very loosely defined. Warschauer (2009) comments that culture has "a long and inglorious history in educational policy and practice" (p. x) and draws attention to many injustices that have been meted out by members of dominant groups. Although nationality, ethnicity, and language have traditionally been perceived

as defining features of culture, working definitions are pluralistic, shifting, and contested. Lahdenperä (2000) identifies seven dimensions of culture: cultural artefacts, repeated patterns of behaviour, collective religious conceptions and belief systems, ways of thinking, emotions, ways of communicating, and relating to one's surroundings and self-concept. This social-constructionist view of culture permeates current discourse and much of the literature discussed in this paper.

Growing student diversity

According to the Royal Society of New Zealand (2013), there has been an unprecedented increase in the ethnic, cultural, social, and linguistic diversity of the New Zealand population, including "over 160 different languages spoken in New Zealand, while Auckland is one of the most culturally diverse cities in the world" (para. 1). In common with universities in many other countries, New Zealand tertiary institutions are facing an increasingly diverse student population. Across New Zealand, the proportion of the indigenous Māori and large Pasifika populations participating in tertiary study is increasing, as is the proportion and range of students from more diverse ethnic backgrounds.

At the start of this study in 2010, Ministry of Education statistics (Wensvoort, 2011) showed that the proportion of students in tertiary education identifying as European had dropped to 59% from 68% in 2000. The proportions of other ethnic groups had increased, with 18% identifying as Māori, 8% as Pasifika, 18% as Asian, and 5% as from other groups. Regardless of ethnicity, most students were citizens or permanent residents, but the figures included a significant number of international students, of whom 72% were Asian. In 2011, the Faculty of Education at the University of Auckland enrolled 256 students with foreign citizenship and, in 2012 there were 330. These students came from a wide range of countries, including Britain, Canada, and the United States as well as Asia, the Middle East, Africa, and Europe.

The most recent statistics published by the New Zealand Ministry of Education (2015) note the trend:

> Compared to 10 years earlier, the age-standardised participation rate has been increasing for bachelors and postgraduate qualifications and decreasing for non-degree qualifications. Māori and Pasifika have higher participation rates in non-degree qualifications than Europeans and Asians. Differences among the ethnic groups in the rates for higher-level qualifications have narrowed. (p. 3)

Growth in online learning

At the same time as ethnic diversity is increasing in tertiary student populations, online learning is becoming more popular for both distance and on-campus students (Guiney, 2011; Mason, 2007). These two trends are strongly related. Goodfellow and Lamy (2009) suggest there are three reasons for the growing diversity in tertiary education:

1. national policies to increase participation in higher education
2. the expansion of transnational e-learning, including enrolments of foreign students and staff development of corporate, governmental, agency, and other "non-educational" providers
3. the spread of new media communication being incorporated into course design (see also Rogers, Graham, & Mayes, 2007).

For these reasons "cultural diversity" may be understood to incorporate a wide range of differences. Thus, in examining the causes of this diversity, we can see that online learning may attempt to provide for the range of educational needs of learners, whilst also encouraging some of that diversity.

Terminology

For this study we have adopted some working definitions.

Culture is a complex and multi-dimensional construct that represents the shared values, beliefs, and basic assumptions of groups of people. It includes elements such as language, customs, social behaviour, and religion, and it influences how individuals relate to the world.

Online education refers to formal courses of study that include significant use of the internet as a means of communication and participation in educational activities and interaction. It includes courses that are conducted entirely at a distance and those that may be considered to be *blended*—for which students also attend face-to-face classes or group meetings.

Within this scope, this study is concerned with courses that are carried out as part of either *initial teacher education* (also known as pre-service teacher training), or *further education* for practicing teachers (also known in New Zealand as professional learning and development, [PLD]).

Literature review

The current study followed a literature review which investigated current understandings of the influence of culture and ethnicity on student success in online learning. This was carried out by an international undergraduate student who was awarded a scholarship to work with the authors under the university's Summer Scholar programme during the 2010–2011 vacation. The specific objective of this review was to carry out a search for literature that focused on the influence of culture and ethnicity on student learning online, and to create an annotated bibliography relating to factors that are relevant to flexible and online teaching and learning in Aotearoa New Zealand, particularly in higher education. The research questions were:

1. What research has been carried out into the influence of culture and ethnicity on flexible and online learning?
2. How can the evidence from this research inform the practice of flexible and online teaching in Aotearoa New Zealand, particularly in higher education?

Literature was identified largely through keyword searching of the ERIC database and Google Scholar. Papers to be read in full were then selected from abstracts, with relevant material selected from that subset. Further material was identified from bibliographies and known New Zealand sources including the Ministry of Education, Ako Aotearoa, and the Tertiary Education Commission. By the end of this review, 327 literature references had been recorded. Of this number, four were books; three were web pages; seven were reports; and the remainder were journal articles, book sections, and conference papers. Of these, 43 papers could not be obtained in the time available and 41 of the remaining papers were considered to be of high relevance.

Major studies

There are already a number of literature reviews covering culture or ethnicity in online learning environments; for example, Rutherford and Kerr (2008) and McAnany (2009). McAnany organises her review of prior research findings into three principles: "do no harm", "know your learner", and "incorporate global concepts". The "do no harm" principle cautions against creating instructional material, including phrases or images, that might evoke an unwanted emotional response in people of different cultures and that, in turn, could impede their learning. For example, representations of alcohol or animals can be offensive to certain groups. The "know your learner" principle suggests that it is important to obtain a clear conception of the target audience who will receive the message, because the nature of the message received is determined by their cultural context, expectations, and experiences. The third principle emphasises the

importance of incorporating global concepts and images in instructional messages to educate and broaden the world view of all learners; for example, by providing references to world-wide historical events, works of art, and other international events and artefacts. In her paper, McAnany (2009) provides a wealth of such practical advice for designers of inclusive learning environments.

The study by Rutherford and Kerr (2008) arose from research for the development of an online module for French-speaking Canadians (e-pedagogies interculturelles) and specifically aims to provide recommendations to teachers and designers to help them create inclusive educational design. Rutherford and Kerr provide a clear review of the field to 2008, and an excellent overview of the models discussed later. They also review other and older frameworks, including the seven aspects of flexibility proposed by Collis, Vingerhoets, and Moonen (1997) in their multidimensional model, which argues that learner choice is at the heart of inclusive design.

Papers with theoretical frameworks

Most of the remaining literature identified in our search fell into one of two types. Some were case studies with little or no theoretical grounding, but the majority of the papers applied or adapted one or more aspects of the main theoretical frameworks that had been developed to conceptualise cultural factors or to aid in culturally inclusive learning design. The most notable of these theoretical frameworks are described below.

Hofstede's model of cultural differences

One of the most widely used frameworks for studying cross-cultural communication, originally in corporate settings, is based on work conducted by Geert Hofstede (2008), Hofstede and Hofstede (2005) and colleagues. Hofstede developed a four-dimensional model of cultural differences which he claimed characterise cultural behaviour originating from different societies. The four dimensions are: small versus large power distance (relationship to authority), individualism versus collectivism, masculinity versus femininity, and tolerance of uncertainty and ambiguity versus uncertainty avoidance. Later he added a fifth dimension—long-term versus short-term orientation—as a result of studying Asian societies imbued with Confucian thought and philosophy (Rutherford & Kerr, 2008). This framework forms the basis of many later models.

Cultural dimensions of learning framework

The cultural dimensions of learning framework (CDLF) (Parrish & Linder-VanBerschot, 2010) builds on Hofstede's framework. It describes eight key cultural dimensions regarding social relationships, epistemological beliefs, and temporal perceptions, and illustrates their spectrums of variability as they might be exhibited in instructional situations. The survey, which the authors based on the CDLF, is intended to illuminate the range of preferences among learners (see Figure 1). The survey is also proposed as a useful tool for educational providers to better understand their own cultural biases and to account for them in their practice.

High- versus low-context cultures

Morse (2003) applied a framework, originally devised by Hall and Hall (1990), in which cultures were compared according to their dependence on context. High-context cultures (generally Asian) place a high value on non-verbal and situational elements of communication, whereas low-context (generally Western) cultures rely on the communication itself being explicit. In online discussions, high-context groups tend to be more "inwardly oriented", meaning these students value the time afforded by computer-mediated communication to think more about their own contributions, whereas low-context cultures tend to value communication with peers (Rutherford & Kerr, 2008, p. 69).

Inclusive pedagogical model

McLoughlin's (2007) inclusive pedagogical model claims that learning is a form of acculturation and that sociocultural approaches are most likely to facilitate the recognition and appreciation of diversity.

New Zealand studies

The annotated bibliography published by the Ministry of Education in New Zealand (Guiney, 2012) points out that international and New Zealand literature on e-learning and non-English speaking learners tends to focus on the differences between Asian and Western learners. International writers draw attention to the problems that Asian students encounter in using the English language, coping with a learner-centred pedagogy, and feeling culturally inhibited in their relationships with other learners. In contrast, the author perceives that New Zealand research tends to report participation in online learning as being a positive experience for Asian students.

Despite this research on Asian learners, the consideration of culturally responsive education in this country has focused on Māori and, to a lesser extent, on Pasifika students. A number of studies were carried out in New Zealand, funded by the Government's e-Learning Collaborative Development Fund (eCDF), which arose out of the Tertiary e-Learning Framework and operated from 2003 to around 2007. Although the New Zealand Council for Educational Research (NZCER; 2004) reviewed a wide range of issues related to e-learning in the general tertiary context, including one section entitled "Māori and e-learning", little could be identified as a cultural dimension.

The NZCER document was followed by a report (Institutes of Technology and Polytechnics of New Zealand, 2005) of a hui (conference) held under the auspices of the Institutes of Technology and Polytechnics of New Zealand (ITPNZ) specifically to discuss e-learning with Māori learners. Cultural issues were, inevitably, a focus of the discussions involving experts in Māori learning and in e-learning, and the report identifies specific issues of pedagogy and philosophy that are of value to e-educators. A companion report, also published by ITPNZ, identified critical success factors for effective use of e-learning by Pacific learners (Koloto, Katoanga, & Tatila, 2006). The latter is grounded in case studies and interviews with learners and teachers, and provided an understanding of issues of e-learning from a Pasifika viewpoint that led to recommendations for practice at institution and course levels.

The recommendations in Koloto et al. (2006) are similar to those for the compulsory education sector presented in *Quality teaching for diverse students in schooling: Best evidence synthesis iteration* (Alton-Lee, 2003), which stresses the importance of making links between the cultural contexts experienced by children at home and at school.

Another eCDF-funded project (Jeffrey, Arkins, Laurs, & Mann, 2006) studied students from different ethnic groups and their learning characteristics—such as their achievement, motivation and preferences for listening, and collaboration or working alone. European students were rated higher than others on independence, intrinsic motivation and a preference for working alone.

More recently, a literature review focused on e-learning environments in the context of te reo Māori and kaupapa Māori education has been published (Tiakiwai & Tiakiwai, 2010). This review "highlights the importance of incorporating Māori cultural practices into e-Learning" (p. 3).

Online learning cultures

In their introduction to an influential volume examining learning cultures in online learning, Goodfellow and Lamy (2009) draw attention to the view of culture shared by models such as

those of Hofstede (2008), Hall and Hall (1990), and others discussed above. They argue that these models stem from an "essentialist" viewpoint that permeates most cultural research, and in which individuals are described in terms of cultural attributes where culture is seen as:

> . . . the manifestation in individuals of all the values, beliefs and ways of thinking and doing things that come with the memberships of particular national, tribal, ethnic, civic or religious communities. Culture, in this view, is a consequence of geographical, historical, climatic, religious, political, linguistic and other behaviour and attitude-shaping influences that are assumed to act on everyone who shares the same physical and social environment. (p. 7)

These frameworks have provided useful practical guidance for educators seeking to design online learning to meet the assumed characteristics of learners (see, for example, Edmundson, 2007), but because this standpoint is usually conducted from a Western, anglophone viewpoint, it raises many issues of ethnocentrism. In contrast, Goodfellow and Lamy (2009) promote a problematised and multi-faceted view of culture and investigation of the notion of "learning cultures". Only recently have internet cultures started to be theorised on their own terms. The views in this edited book encompass "cultural learning styles" (the preferences of individuals), "cultures of learning" (the norms and values associated with learning in specific institutions), and "learning cultures". One of the contributors, Ess (2009), argues that cultural identity is a hybrid that has many more dimensions than nationality or mother tongue. He also views online environments as culturally coded spaces that invite the formation of "third cultures" based on the combination of elements from different cultural traditions in which individuals socialise to form their own identity(s).

In carrying out this study we have attempted to hold to this complex view of culture, and to remain aware that online learning involves the interplay of a large number of cultures, including those that result from the multiple communities of the learners and of the teachers, the prior learning (and teaching) experiences of these participants, the culture of the institution, and that of the internet itself. In teacher education we must also add the culture of the profession to which the participants belong, or are preparing to join.

According to Major (2005), exploring and understanding one's own cultural, linguistic, and ethnic identities before examining those of others is an essential starting point for multicultural education programmes. While that personal study is now an important component of initial teacher education, it is our view that online educational environments bring additional cultural challenges. As a consequence, we established a study to explore cultural dimensions of online learning in teacher education and to develop an approach in which we apply the understanding gained to improve the experience and outcomes for students participating in this mode of learning.

Our trial CDLF survey

Our survey of the literature convinced us and our colleagues that there was a need for greater recognition of cultural diversity in the design and teaching of online courses, particularly those targeting students from "non-traditional" backgrounds (who are increasingly sought by the university). The literature reviewed above provides strong support for the view that one appropriate strategy for a culturally diverse group of students is to engage lecturers and students in discussions that would reveal the cultural values of each individual. Current practice in initial teacher education is to engage students in identifying their own values and beliefs, and it is appropriate to extend this to the online environment. This extension fits well with the needs of teacher education, where students are preparing to take on the teacher's role in a multicultural school or centre.

If, as is claimed, the CDLF (Parrish & Linder-VanBerschot, 2010) helps designers and lecturers to acknowledge and better understand the cultures and norms that they and their students bring to learning, the framework and its survey should be a useful diagnostic tool for professional learning. Lecturers and teacher education students in online education courses could use such a tool to reflect on their own preferences and use that understanding to enhance their learning. By examining their prior conceptions, participants may also be better able to understand the challenges of working in inter-cultural environments. By clarifying their beliefs and those of their students, lecturers would also be in a better position to plan effectively to meet their students' diverse needs and to respond to students as the course progresses.

Research questions

The questions therefore became: (a) Can the CDLF provide students and lecturers in online teacher education courses with relevant data to examine their personal preferences for learning and teaching? and (b) How could this approach be developed in practice? Therefore, in the initial phase of the study a trial of the survey was planned with a group of students and staff to answer the following questions:

- How do participants respond to the items?
- Do participants display diversity in their responses?
- Do the responses display identifiable differences based on cultural and other factors?
- Does the pattern of responses support the eight cultural dimensions to which they have been related?

The second phase of the study, dependent on the outcome of the first, was to design and trial tools based on these findings to provide practical ways of engaging students and lecturers in an examination of the values that may affect their participation in online learning.

Procedures

In the first phase, students and teaching staff participating in online courses in the Faculty of Education were invited to anonymously complete the online CDLF survey. We intended to analyse the survey data to reveal patterns of response and compare sub-groups of participants. The intention was to also collect sufficient data over time to enable a factor analysis as the first step in developing an instrument for further use. Approval for the study was obtained from the university's Human Participants Ethics Committee at the end of 2011, and lecturers of the online courses offered in the first semester of 2012 were contacted and asked to agree to their students being approached through their course's Moodle website. This process was repeated in the second semester. A total of 140 students in the 11 courses were invited to participate.

Parrish and Linder-VanBerschot constructed the CDLF survey with 36 items that were designed to measure eight dimensions of learners' views about learning in the three areas of social relationships, epistemological beliefs, and temporal perceptions. These dimensions are explained in detail by Parrish and Linder-VanBerschot (2010) and are summarised in Table 1. By combining scores for the items relating to each dimension it was intended that users could get an indication of the degree to which their views fall towards one end of the dimension or the other.

Table 1 The cultural dimension of learning framework

Cultural dimension		Related questions
Social relationships		
A	Equality and authority	How is inequality handled? How is status demonstrated and respect given? What interactions are appropriate for those of unequal status?
B	Individualism and collectivism	Which prevails—the interests of the individual or the interest of the group? To what degree are interpersonal relationships valued?
C	Nurture and challenge	Which is the more important set of goals—cooperation and security or recognition and advancement? Which achieves better learning outcomes—supportive acts or challenging acts?
Epistemological beliefs		
D	Stability seeking and uncertainty acceptance	How is uncertainty dealt with? Is it avoided or accepted? Is structure assumed to be more important than flexibility? What is the status of knowledge—established or in a process of development?
E	Logic argumentation and being reasonable	How are arguments developed? Which is more important—logical consistency or practical outcomes? How is disagreement managed?
F	Causality and complex systems (analysis and holism)	How is causality assigned typically? Is it assigned to a single, most likely source, or is it assigned to the broader context?
Temporal perceptions		
G	Clock time and event time	Do people conform to an external measure of time, or do they allow the event at hand to unfold in its own time? Which are more important—deadlines or relationships?
H	Linear time and cyclical time	Do people see time as a path and see goals as necessary destinations, or do they see time as a pattern of interlocking cycles into which they step in and out over the course of a life?

Adapted from Parrish and Linder-VanBerschot (2010, pp. 7–9)

The survey was trialled in the original format designed by Parrish and Linder-VanBerschot (2010), with only minor changes to reword items that were specifically oriented to face-to-face or classroom environments. Items 2, 3, and 4 were modified: “class discussions” (Q. 2, 4) was changed to “discussion forums”, “class discussion” (Q. 3) changed to “online discussion”, “classroom time” (Q. 31) changed to “course activities”, and “each day” (Q. 31) changed to “as the course progresses.” These items (see Table 2) were coded into the Quiz module in the Moodle learning management system. In the second semester, questions were added to gather feedback on the survey itself.

Table 2 The first four items in the CDLF survey used in this study, based on the "Survey on Culturally Based Learning Preferences" designed by Parrish and Linder-VanBerschot (2009b)

Instructions: Select the number that best indicates the level to which you agree with one or the other statement. Selecting 1 indicates that you strongly agree with the left-hand statement, selecting 10 indicates that you agree strongly with the right-hand statement. Selecting other numbers indicates lesser degrees of agreement with one side or the other.			
0	**Example:** Open discussions in online forums are critical for learning online.	1 2 **3** 4 5 6 7 8 9 10 *Selecting **3** indicates that the left-hand statement describes your opinion best, but only to a moderate degree.*	Students should read in an online course and not interact unless asked to do so.
1	Students should feel comfortable engaging in dialogue if they disagree with their teacher—it is part of learning.	1 2 3 4 5 6 7 8 9 10	Students should not openly disagree with or challenge their teacher—it disrupts learning.
2*	*Discussion forums* are for trying out new ideas, testing one's knowledge, and asking questions.	1 2 3 4 5 6 7 8 9 10	Before entering *discussion forums*, students should have mastered the course content so that they will have minimal questions.
3*	Students should participate in the decision on what is discussed and what activities occur in *the course*.	1 2 3 4 5 6 7 8 9 10	The *teacher's* assignments and activities defined in the syllabus should be followed without deviation.
4*	Students should feel comfortable contributing to *online* discussion whenever they have something to add.	1 2 3 4 5 6 7 8 9 10	After the teacher has presented material, students should think about it carefully before contributing to *online* discussion.

*These items have been modified are marked with an asterisk and the new wording is italicised.
Note: The survey was administered online.

All invited participants were given access to this survey and the participant information through a hyperlink which they received in an email and was permanently accessible from their course Moodle site. Data collected by Moodle did not provide any information that could identify the person completing the survey. Although the data was downloaded as a text file, it was discovered that, owing to a software error, not all fields could be accessed in this way and so an assistant manually transcribed the missing codes. Some initial calculations were carried out in a spreadsheet before being further analysed in SPSS statistical analysis software.

Participants

In 2012 and 2013, researchers received 112 responses to the survey. Details of the respondents are shown in Table 3. As noted earlier, 140 students were enrolled in these courses, making an 80% return rate for students. The far greater number of female respondents (91%) reflects the small number of male students enrolled in the courses—a common characteristic of initial teacher education. When students were asked to state the ethnic group or groups with which they identified, the majority (70%) identified themselves as European, Pākehā,[1] or from a specific

[1] Pākehā is a Māori term for a European, and is used by many non-Māori in New Zealand.

European country. The data about programmes of study indicates that students in both initial teacher education and further study are represented. Lecturers teaching online courses were invited to respond, but only four did so. Their inclusion with the students helps to maintain the lecturers' confidentiality. It was interesting that, despite the length and complexity of the survey, only 15 of the CDLF items were unanswered out of a total 4032 items over all respondents.

Findings

The demographic data presented in Table 3 shows that the sample was overwhelmingly female, student, and of European ethnicity. Therefore, it was not possible to seek significant differences between sub-groups (such as men and women or different ethnicities). The means, standard deviations, and distribution of responses for each item and related information are summarised in Appendix A by using box plots for each of the eight dimensions. The distribution of average scores for each dimension is presented in Appendix B, following Parrish and Linder-VanBerschot's (2009a) recommendation that users determine where their average scores lie for each dimension (in the middle, left, or right). In this way, scores for items were also combined for each dimension, showing the distribution of respondents who placed themselves at either end or in the middle of each dimension. To this end the mean score of items in a dimension was calculated and a decision made about which third of the range they fell into. The distribution of these scores is shown by bar charts in Appendix B.

Table 3 Demographic details of initial respondents

		Number	**%**
Total responses		**112**	**100**
Role	Students	108	96.4
	Lecturers or tutors	**4**	3.6
Sex	Female	102	91.1
	Male	10	8.9
Age	Under 21 yr	1	0.9
	21–30 yr.	31	27.7
	31–40 yr.	34	30.4
	41–50 yr.	29	25.9
	Over 50 yr	17	15.2
Ethnicity	European/Pākehā	78	69.6
	Māori	6	5.4
	Pasifika	8	7.1
	Asian	15	13.4
	Latin American	1	0.9
	Middle Eastern	1	0.9
	None stated	3	2.7
Programme of study	Bachelor	35	31.3
	Graduate diploma	26	23.2
	Post-graduate diploma	22	19.6

	Masters	23	20.5
	COP	2	1.8
	Not stated	4	3.6

To provide an indication of the degree of consistency in individuals' choices for the items in each dimension, a bivariate correlation matrix was calculated to show relationships amongst all of the items. For simplicity, Appendix C shows only the correlations between items in each of the eight dimensions, for which strong relationships could be expected.

The distributions of scores and the average responses are of interest because one purpose of the survey was to highlight differences on each of the eight dimensions. In general the distributions of scores for most items (which can be seen in the box plots) were wide, but usually skewed to one extreme. This may be taken to indicate an average preference. Some individual items in a dimension have a noticeably smaller spread of responses, indicating more agreement between respondents.

Diversity of responses for any dimension is valuable as an indication that learners may differ in their personal preferences. Agreement between respondents may indicate that they share similar beliefs or that the items cannot distinguish between their beliefs for a number of reasons.

We cannot deduce, from this data, the extent to which individual students' responses are consistent within a dimension. Although diversity of responses in any dimension is valuable as an indication that learners may differ in their personal preferences, consistent response by an individual is also important. Consistency across all items in any one dimension would suggest that the questions may be measuring the same attribute; some indication of this can be gained from the bivariate correlations.

The overall trends apparent in the box plots are more clearly seen in the bar charts; Figure 1 shows box plots and bar charts for the first two dimensions, and Appendices A and B provide them for all eight dimensions.

A	Equality and authority	How is inequality handled? How is status demonstrated and respect given? What interactions are appropriate for those of unequal status?
B	Individualism and collectivism	Which prevails—the interests of the individual or the interest of the group? To what degree are interpersonal relationships valued?

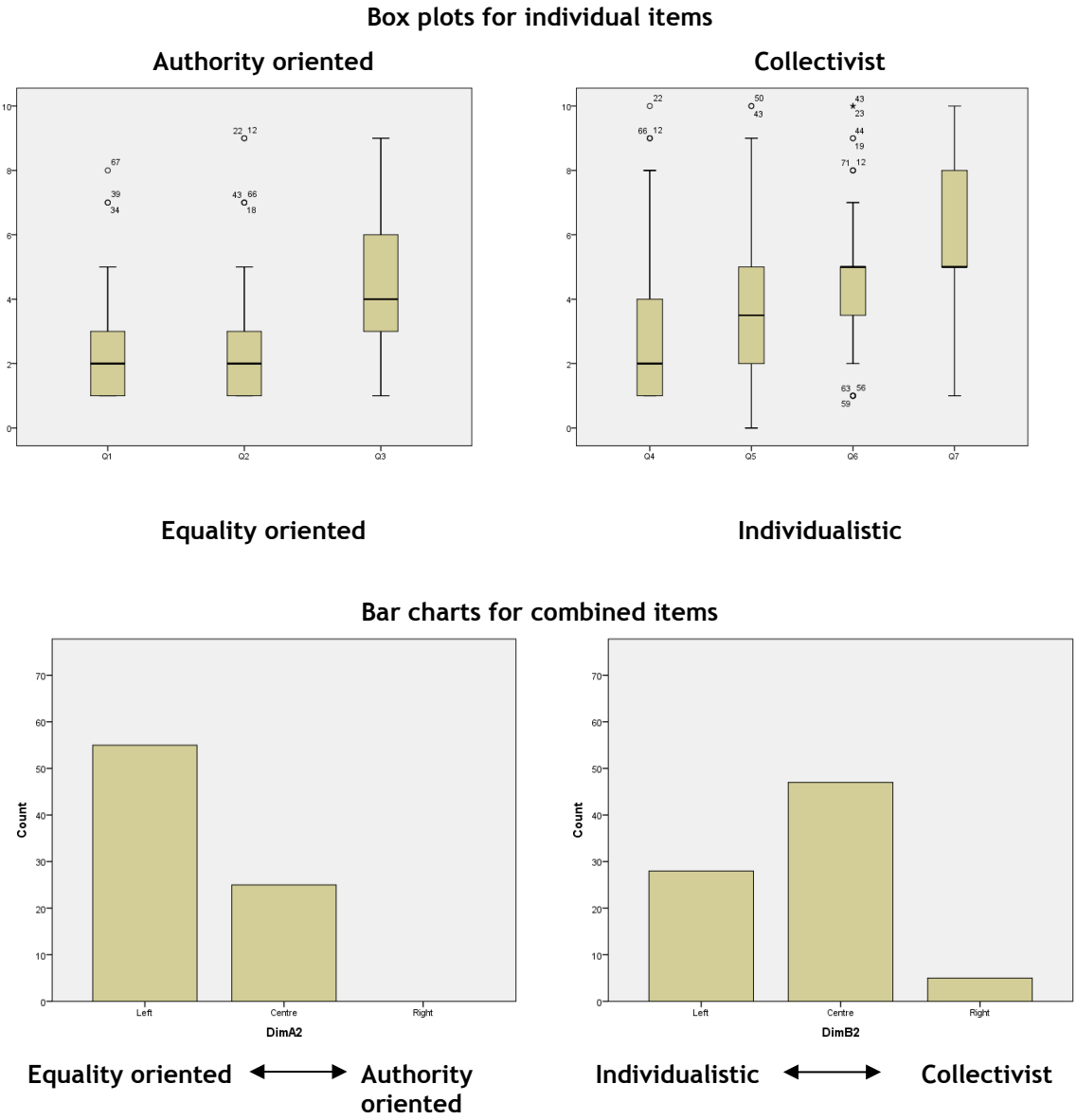

Figure 1 The measures of the first two dimensions in box plots and bar charts (see Appendices A and B)

If we accept, at face value, that the items represent aspects of the theoretical dimensions then these results indicate that, on average, respondents were clearly oriented more towards nurturing than challenging, and slightly less towards equality than authority. There was a clear tendency to accept uncertainty over seeking stability, and less tendency to select event time over clock time. The other dimensions were, on average, more balanced. An overview can be gained from mean scores and standard deviations for each dimension shown in Table 4, which combines results for all items related to each dimension. The standard deviations indicate the spread of individual preferences.

Table 4 Mean scores for each dimension for all respondents, with a midpoint of 5.5

Dimension	**N**	**M**	**SD**
Equality — authority	112	3.11	1.36
Individualism — collectivism	112	4.32	1.46
Nurture — challenge	112	2.74	1.04
Stability seeking — uncertainty acceptance	112	7.26	1.30
Logic argumentation — being reasonable	111	5.43	1.39
Causality — complex systems (Analysis — holism)	111	5.52	1.59
Clock time — event time	111	6.68	1.63
Linear time — cyclical time	112	5.15	1.02

Note: Scores lie in the range 1–10. A mean of 1 indicates unanimous selection of the first pole (1) of the dimension while a score of 10 indicates unanimous selection of the second pole (10). The middle point of the scale is 5.5

The correlation matrices (see Appendix C) show the degree to which individual students' choices for items were related in each of the eight theoretical dimensions. While some correlations are statistically significant, there are few strong relationships and little or no correlation appears between many items, suggesting that a number of the items might not be indicators of these dimensions.

An additional problem relating to the face validity of dichotomous scales is particularly important in Aotearoa New Zealand, where the Treaty of Waitangi formally recognises the importance of indigenous world views. Fields, Davis, and Hartnett (2015) clarify the relevance of this in relation to online learning, citing the Māori leader Durie (2011). The CDLF was constructed from a non-indigenous perspective and its apparently linear scale could be open to wider interpretation from an indigenous perspective. Take, for example, the second dimension (as described earlier) and the interpretation of the midpoint of the scale (5.5):

Individualism and collectivism	Which prevails—the interests of the individual or the interest of the group? To what degree are interpersonal relationships valued?

Both the good of the whole community and the value of relationships that are personally relevant to each individual are important in some cultures, including indigenous Māori. A choice of midpoint may be interpreted as a wish for both in equal measure. However, it could also be interpreted as a wish for neither, or that the respondent does not perceive that they are relevant. In other words, the 1–10 scale might be a simple linear measure that is wildly inaccurate when used on a multi-dimensional construct.

Discussion

The data gathered provide some interesting indications of the apparent preferences of the participants. The participants expressed a range of responses to the items, some of which may indicate differing preferences to inform online teaching approaches. There appears to have been agreement on some dimensions. All participants were involved in teacher education and most have a European heritage, which may explain some of the similarity in responses. The apparent agreement may be a result of a lack of cultural diversity in the group or beliefs shared for other reasons, but could also indicate that the items cannot differentiate between respondents' beliefs.

However, the lack of robust correlations in the correlation matrix throws doubt on the validity of a number of items as indicators of the eight theoretical dimensions. Parrish and Linder-VanBerschot had called for further validation. Subsequent to trialling the survey as reported here, information was received from a researcher at Maastricht University who also could find no other work on the CDLF survey and had analysed a survey of 1850 students, finding little evidence of the reliability in the eight sub-scales (D. Tempelaar, personal communication, April 18, 2014).

The authors of this study therefore conclude that this survey is not suited to describing and comparing groups of learners. However, the CDLF survey may be a useful pedagogic strategy that continues to fit the intention of its designers, which was to promote self-reflection by helping students to relate their own beliefs to the CDLF. This strategy is recommended by the survey designers, who propose the following questions for respondents to consider along with their scores (Parrish & Linder-VanBerschot, 2009a):

> **Questions to ask yourself:**
>
> Do these results feel accurate? In what situations might they not be accurate?
>
> Do these preferences explain why I enjoy some learning experiences but not others?
>
> How can I adapt my learning habits to reflect my learning preferences?
>
> How can my instructor adapt his/her teaching style to reflect my learning preferences?
>
> To what extent are my learning preferences similar to or different from the other members of the learning community? (p. 2)

At an individual level, therefore, analysis of responses could still provide a useful basis for participants in online education to consider their own preferences and compare these with those of their peers, while also facilitating critique by applying indigenous world views. By observing and facilitating the students' interpretation and debate, teacher educators could become more aware of the relevant attitudes of their students. The ensuing discussion has the potential to make learning and teaching more effective in a programme or course.

Conclusion

The opportunities for digital technologies to connect students in open, distance, and flexible learning with their lecturers and peers continue to grow. Nevertheless, using this technological connectivity effectively to engage and support e-learners from diverse cultural backgrounds is not a simple task. This view is reinforced by the literature reviewed in this paper. It remains a challenge (particularly in the short timeframes of a teacher education programme) to nurture productive communities of learners so that they are equipped to maximise the potential benefits from the sociocultural pedagogies that are usually aligned with e-learning. There is work to be done to design and provide education that is relevant to the context and culture of the increasing

diversity of learners. This is particularly important for universities in New Zealand, which has a super-diversity of languages (Royal Society of New Zealand, 2013).

It appears from the study reported in this paper that there may well be differences in the way people from different cultures approach learning, but it's not a simple matter. The essentialist descriptions provide hints and suggestions about possible ways to approach the problems of teaching in these conditions, but they also distract when they reinforce misperceptions of culture as monolithic and predictable. Rutherford and Kerr point out that "we all belong to several cultural groups and our individual cultural identities are constructed gradually through the interaction of these different cultural layers" (2008, citing Collis, 1999 p. 69). It is therefore important that lecturers and course designers become aware of differences—particularly potentially offensive or isolating aspects—so they can avoid them when designing online learning and related teaching. All educators need to be aware of the cultural values of the teaching and learning environment that they create or promote, and this is perhaps even more important in virtual learning environments.

We believe that one practical way of achieving this cultural awareness is to reveal the hidden assumptions of all participants and of the online environment itself. Making some of these assumptions and differences explicit by sharing students' personal experiences may be a constructive way to begin. This paper has described initial work on one possible approach using the CDLF, while also questioning the validity of its eight dimensions and its simple scale.

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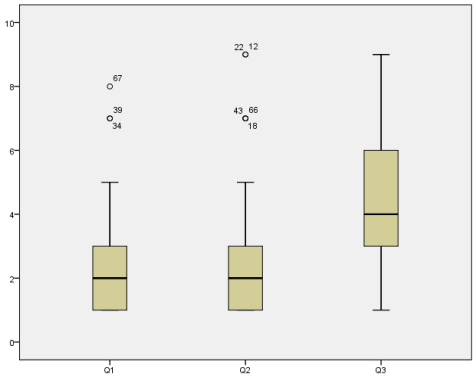
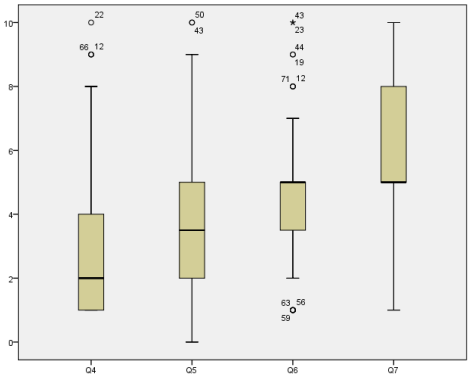
Appendix A: Distribution of survey scores for individual items in box plots for each of the eight dimensions

Authority oriented



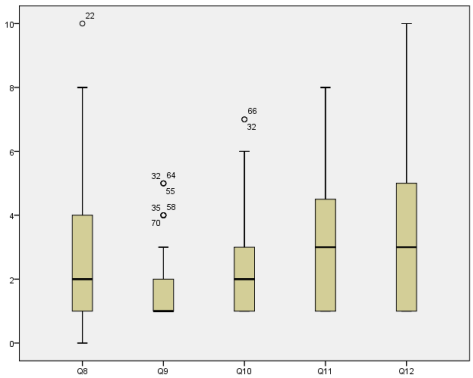
Collectivist



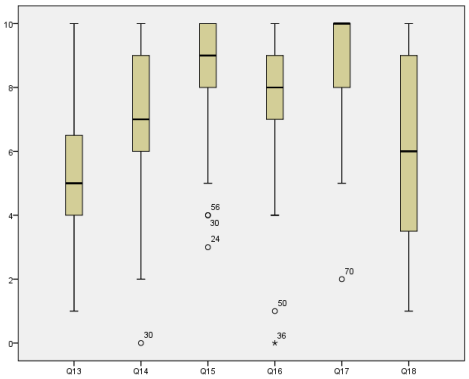
Equality oriented

Individualistic

Challenging



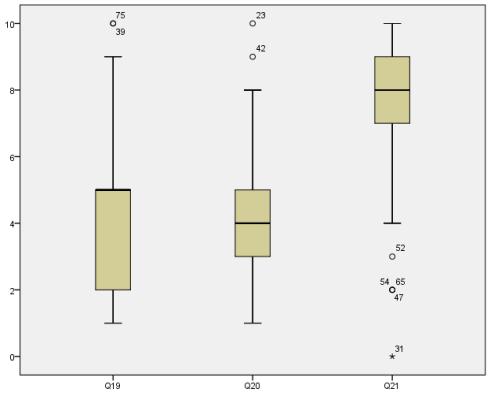
Uncertainty acceptance



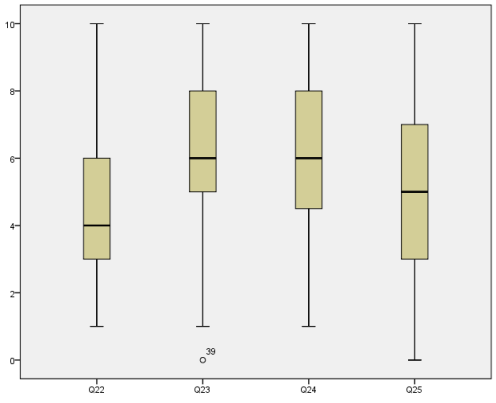
Nurturing

Stability-seeking

Reasonable



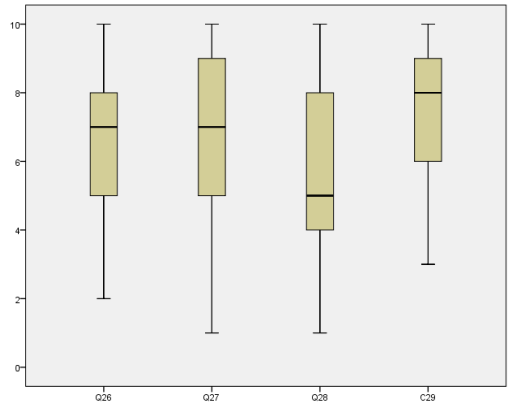
Focus on systems & situations



Logical

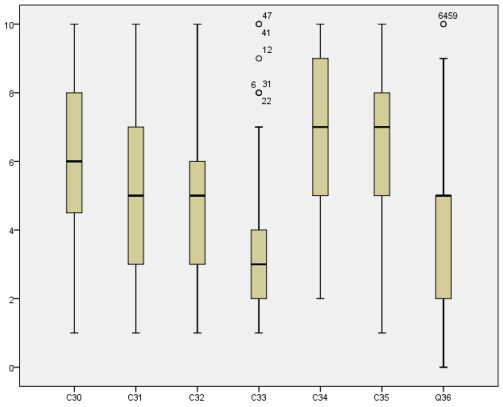
Focus on causality

Event focus



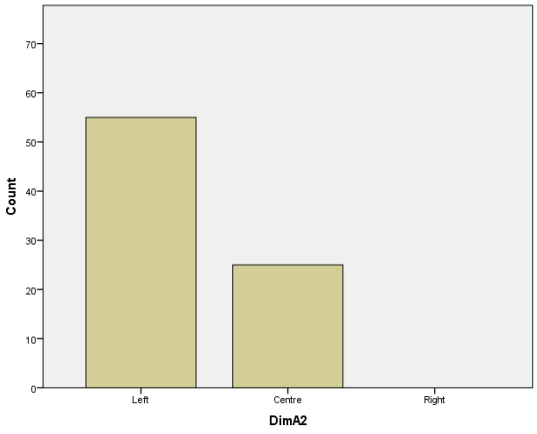
Clock focus

Cyclical time oriented

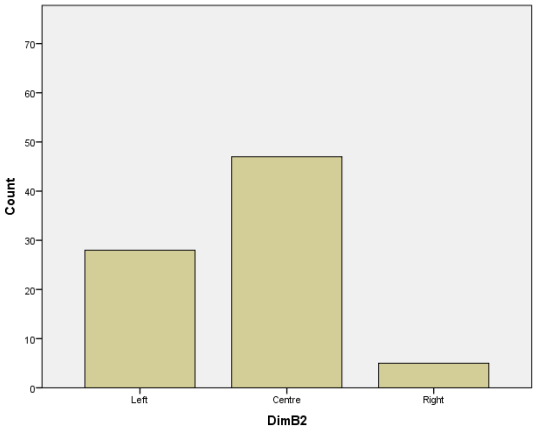


Linear time oriented

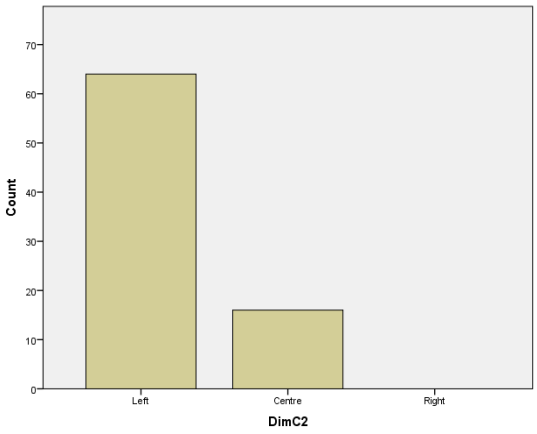
Appendix B: Distribution of average survey scores for each dimension



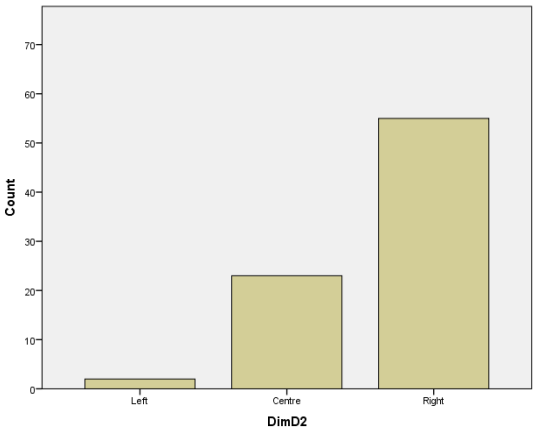
Equality oriented ⟷ Authority oriented



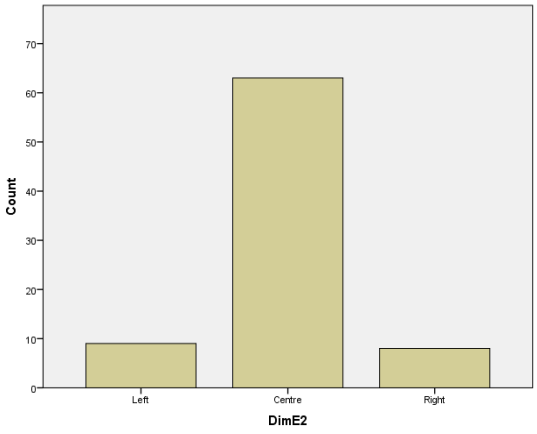
Individualistic ⟷ Collectivist



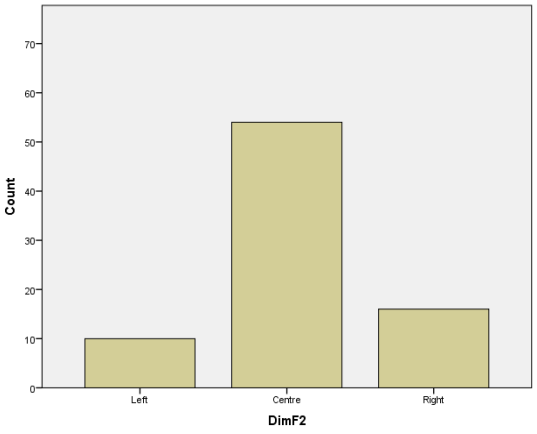
Nurturing ⟷ Challenging



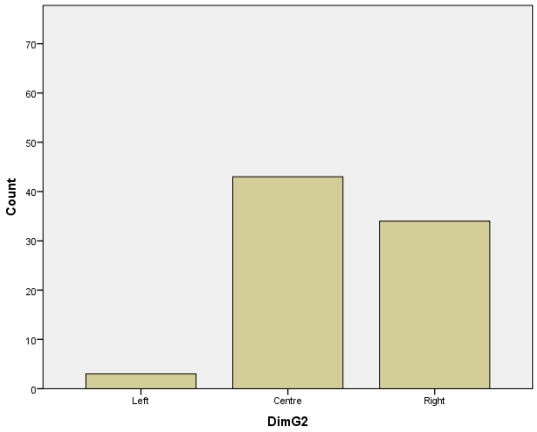
Stability-seeking ⟷ Uncertainty acceptance



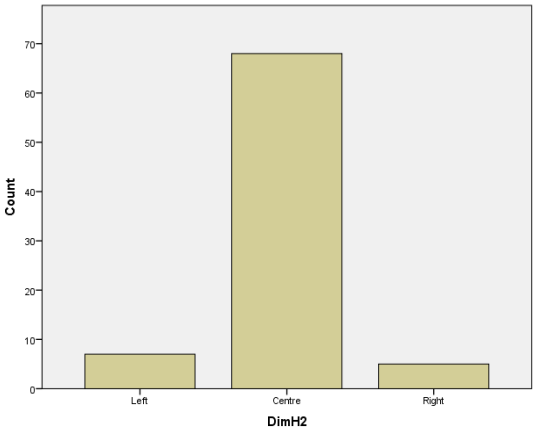
Logical ⟷ Reasonable



Focus on causality ⟷ Focus on systems and situations



Clock focus ⟷ Event focus



Linear time oriented ⟷ Cyclical time oriented

Appendix C: Correlations between scores on items in each of the survey's eight dimensions

Equality — authority			
Item	Q1	Q2	Q3
Q1	1		
Q2	0.36**	1	
Q3	0.21*	0.14	1

Individualism — collectivism				
Item	Q4	Q5	Q6	Q7
Q4	1			
Q5	0.10	1		
Q6	0.31*	0.36**	1	
Q7	-0.05	0.18	0.16	1

Nurture — challenge					
Item	Q8	Q9	Q10	Q11	Q12
Q8	1				
Q9	0.02	1			
Q10	0.06	0.27**	1		
Q11	0.10	0.21*	0.36**	1	
Q12	0.21*	0.11	0.00	-0.04	1

Stability seeking — uncertainty acceptance						
Item	Q13	Q14	Q15	Q16	Q17	Q18
Q13	1					
Q14	0.29**	1				
Q15	0.27**	0.53**	1			
Q16	0.22*	0.40**	0.42**	1		
Q17	0.30**	0.36**	0.36**	0.34**	1	
Q18	-0.14	0.12	0.09	-0.01	0.12	1

Logic argumentation — being reasonable			
Item	Q19	Q20	Q21
Q19	1		
Q20	0.10	1	
Q21	0.05	0.16	1

Causality — complex systems/Analysis — holism				
Item	Q22	Q23	Q24	Q25
Q22	1			
Q23	0.11	1		
Q24	0.31**	0.05	1	
Q25	0.30**	0.18	0.04	1

Clock time — event time				
Item	Q26	Q27	Q28	Q29
Q26	1			
Q27	0.52**	1		
Q28	0.30**	0.26**	1	
Q29	0.20*	0.06	0.25**	1

Linear time — cyclical time							
Item	Q30	Q31	Q32	Q33	Q34	Q35	Q 36
Q30	1						
Q31	0.42**	1					
Q32	0.10	-0.03	1				
Q33	-0.05	-0.19	0.07	1			
Q34	0.22*	0.07	0.02	0.02	1		
Q35	-0.04	-0.15	-0.16	-0.01	0.12	1	
Q36	0.21*	0.12	0.04	0.15	-0.05	-0.02	1

n = 112

* significant with p<0.05

** significant with p<0.01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