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Individual Differences in Sense of Classroom Community in a Blended Learning Environment

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ABSTRACT *Classroom community may be referred to as the sense of trust and interaction between groups of learners, and it has been argued that sense of community is imperative to successful learning. The construct of cognitive style has frequently been used to explain differences in the educational attainment and has also been found related to social behaviour. The aim of this study was to investigate the relationship between cognitive style as measured by the Cognitive Styles Index (Allinson & Hayes, 1996) and sense of classroom community as measured by the Classroom Community Index (Rovai, 2002) in a group of students pursuing courses in a blended learning environment. The study also looked at the effects of gender on sense of community. The results indicate that the students with intuitive cognitive styles report a lower sense of community than students with an intermediate or analytic style; however, few differences were found with respect to gender. The results are discussed in terms of the utility of the construct of cognitive style in predicting social behaviour and guiding the design of blended learning environments.*

Introduction

E-learning programmes can no longer be thought of exclusively in terms of static Web-based instructional systems and for some time such programmes have allowed the facility for online interaction between learners. It has been suggested that such interactions between learners in online programmes are vital to their success (for example, Shale & Garrison, 1990). Further studies also provide evidence to support the benefits of online collaborative environments. Citera (1998) suggests that online discussions encourage more reticent individuals to participate to a greater extent, and Warschauer (1997) advocates interaction in online environments, as there is less opportunity for intimidation between individuals and also less time pressure on them than in face-to-face settings.

Conversely, lack of close interaction between learners may have adverse consequences, possibly because learners experience feelings of isolation. Indeed, such a finding was reported by Haythornthwaite *et al.* (2000), who suggested that the

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participants in their study who failed to make online connections with other learners in their group reported feeling isolated and more stressed than those who made more connections. This sense of interaction between learners is referred to as sense of classroom community. Rovai (2002) offers an explanation of sense of classroom community as being mutual interdependence and a sense of trust and interaction among community members. This means that the members of the community have shared goals and values. Online community needs to be thought of in terms of the activities people perform together in their group and not physically where they perform such activities.

There are four components of classroom community outlined by Rovai (2001), and these are described as follows. First, 'spirit' is the feeling of belonging to and acceptance of a group identity. This refers to the recognition of membership of a community and the feelings of cohesion that develop among learners in a group as a result of this. Second, 'trust' is simply the feeling that the group can be trusted and the group members will give feedback to each other. Once this is established, members of the group or community can speak with confidence to other members of the group. Third, 'interaction' is the feeling that community members have that they may benefit by interacting with other members of the community. Finally, 'learning' is the sense that community members have that learning can come about due to the community discussing information; that is, knowledge can be constructed by the community. In a typical online environment group members may engage in interactive behaviour such as discussion, exchange of ideas and seeking advice.

Although a strong sense of community would seem important in online interaction between learners, it is conceivable that such a sense of community may differ between individuals, and that sense of community may be more crucial to some learners than to others. For example, Rovai (2001) found that females report a higher sense of classroom community than males. Furthermore, Kim and Bonk (2002) noted differences in online collaboration cross-culturally between Finland and the United States.

Cognitive style

Sense of community may also be related to other individual difference dimensions, and one that has been used with great profit within the educational domain is cognitive style. Cognitive style has been shown to be related to preferences for the way in which educational material is presented (Riding & Al-Sanabani, 1998; Riding & Douglas, 1993; Riding & Sadler-Smith, 1992). Further studies have shown hypermedia environments can be matched to the cognitive style of an individual in order to facilitate learning (Graff, 2003; Graff & Byrne, 2002).

Furthermore, cognitive style has been shown to be related to differences in social behaviour. For example, Witkin *et al.* (1979) proposed that the field-dependent–independent cognitive style dimension was related to personality, with field-independent individuals being less socially aware than field-dependent individuals. Also, Riding (1991) suggested that cognitive style was related to the degree to which individuals are dependent or self-reliant and flexible or consistent.

Therefore, because of its relationship to social behaviour and social awareness, it is possible that the construct of cognitive style may be used to predict differences between individuals in their need for online classroom community.

Aim

Rovai (2002) argues that the feeling of community among learners may increase their persistence in online learning programmes, and therefore a consideration of classroom community should feature highly in the design of online learning systems. However, more information is required on differences between individuals on their need for a sense of community in order to tailor online systems to individual needs. This study aims to investigate differences in sense of community between individuals of different cognitive styles and also to investigate gender differences in sense of community.

Method

Participants

Sixty participants took part in this study, 46 males and 14 females, with a mean age of 32.93 years (standard deviation 6.21), a minimum age of 29 years and a maximum age of 47 years. All participants were enrolled on an online course studying aspects of business studies. However, participants enrolled on these courses engaged in regular face-to-face interaction with fellow students.

Instruments

Cognitive Styles Index (Allinson & Hayes, 1996) The Cognitive Styles Index (CSI) is a self-report test designed to measure the analyst-intuitive dimension of cognitive style. The term intuitive is used to describe an individual who makes judgements based on feelings and who adopts a global approach to processing information, whereas the term analytic describes an individual who makes judgements based on reason and who focuses on specific detail when processing information. Analysts tend to be inward looking and self-reliant, whereas intuitives are more socially directed orientation and look more to others. The CSI contains 38 statements, to each of which a respondent must indicate a true/uncertain/false response. It has a theoretical maximum score of 76. Higher scores indicate a more analytical cognitive style and lower scores indicate a more intuitive style.

The psychometric properties of the CSI instrument are documented by Allinson and Hayes (1996). From a sample of 1000 participants, they report a mean score of 38.5. Furthermore, graphical inspection and a Kolmogorov–Smirnov 'goodness of fit' test suggests that the test scores are normally distributed. Test–retest reliability of the instrument is also sound ($r = 0.90$, $p < 0.001$), and mean scores of 34.60 and 35.40 indicate no significant changes over time ($t = 0.82$, $p > 0.05$). Finally, internal consistency scores measured by Cronbach's alpha taken from seven independent

samples range from 0.84 to 0.92. The construct validity of the CSI has also been reported by Allinson and Hayes (1996). They report statistically significant relationships between the CSI and scores on the Myers Briggs Type indicator. For example, the CSI correlated positively with the extroversion–introversion ($r = 0.57$, $p < 0.001$) dimension, and correlated negatively with the sensing–intuitive ($r = -0.41$, $p < 0.05$) and judgement–perception ($r = -0.41$, $p < 0.01$) dimensions of this instrument.

Classroom Community Index (Rovai, 2002) The Classroom Community Index (CCI) is a self-report instrument consisting of 40 items, requiring a response on a five-point Likert-scale ranging from strongly agree to strongly disagree. Scores on the questionnaire range from 0 to 160, with low scores reflecting a weak sense of community and a high score reflecting a strong one.

The questionnaire also features four subscales of spirit, trust, interaction and learning, with 10 items measuring each and scores ranging from 0 to 40. Each of these dimensions were described in the Introduction.

Rovai (2002) reports a high degree of face validity of the instrument, in that the items appear to measure what is needed to assess community. Internal consistency estimates using Cronbach's alpha as reported by Rovai (2001) reached 0.96 for the total scale, 0.90 for the spirit subscale, 0.84 for the trust subscale, 0.84 for the interaction subscale and 0.88 for the learning subscale.

Procedure

Participants were simply sent both of the instruments by e-mail, which contained a hyperlink to a Web form. They then responded to each instrument on the form and submitted this back to the researchers.

Data analysis

For the purpose of data analysis, cognitive styles were categorised according to three style types according to scores from the CSI as follows. Intuitives were individuals scoring ≤ 29 on the CSI, intermediates scored between 30 and 40, and analysts scored ≥ 41.

As stated earlier, low scores on the CCI indicate a weak sense of community, whereas high scores represent a strong sense of community.

Results

A one-way (analyst, intermediate, intuitive) multivariate analysis of variance was carried out for the classroom community index and each of its subscales. The means and standard deviations for scores on the community index and cognitive style are presented in Table I.

A significant effect was noted for the scale overall (F (2, 49), $= 3.86$, $p = 0.02$) and for the spirit subscale (F (2, 49) $= 5.49$, $p = 0.00$). No effects were observed for trust, interaction and learning.

TABLE I. Classroom community scores by cognitive style

	Intuitive	Intermediate	Analyst
Spirit	23.75 (5.54)	25.39 (6.54)	19.39 (4.52)
Trust	22.50 (2.60)	23.11 (3.10)	21.67 (3.36)
Interaction	20.69 (3.11)	20.06 (4.27)	18.44 (4.96)
Learning	22.00 (3.55)	22.61 (4.21)	21.89 (3.69)
Total	88.94 (8.79)	91.17 (11.51)	81.39 (12.22)

Figure 1 illustrates that intermediates scored highest for the overall community scores, with intuitives scoring lowest on sense of community.

Figure 2 illustrates that intermediates scored highest for the spirit subscale with intuitives scoring lowest on sense of community.

A Bonferroni test of post-hoc comparisons revealed significant differences between intuitives and intermediates for the sense of community scale overall ($p < 0.03$) and also a significant difference between intuitives and intermediates for the spirit subscale ($p < 0.00$).

Five independent *t*-tests were performed to assess the differences in sense of community between males and females. A significant difference was noted only for interaction (t (58) = 2.76, $p = 0.00$), with females displaying higher interaction scores than males. A difference approaching significance was also noted for trust (t (58) = 1.90, $p = 0.06$), again with females scoring higher than males. Table II presents the gender differences for this study and a comparison with a post measure carried out by Rovai (2001).

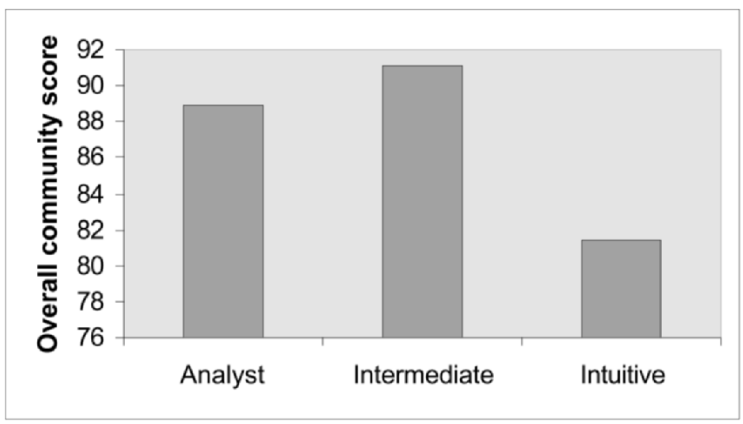

FIGURE 1. Overall community score for cognitive style type.

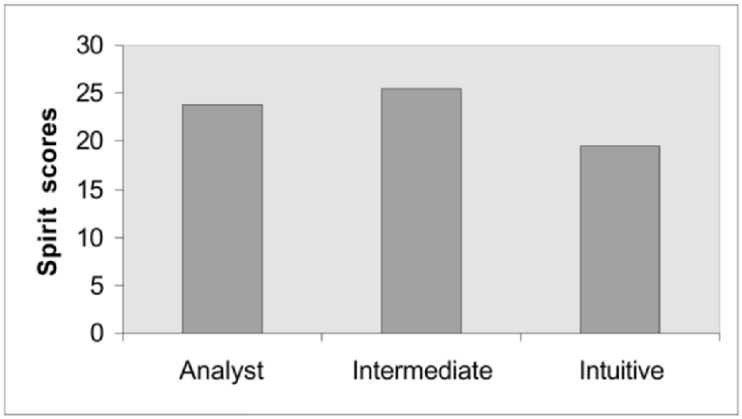

FIGURE 2. Spirit scores for cognitive style type.

TABLE II. Classroom community scores by gender

	Rovai (2001)		Present study	
	Male	Female	Male	Female
Spirit	24.25 (9.57)	32.86 (5.84)	23.03 (6.11)	22.29 (5.83)
Trust	31.25 (7.14)	35.29 (3.64)	21.88 (3.00)	23.39 (3.15)
Interaction	29.00 (5.23)	34.57 (4.28)	18.31 (4.19)	21.14 (3.66)
Learning	33.50 (6.86)	38.43 (2.51)	22.28 (3.42)	22.25 (4.24)
Total	118.00 (27.17)	141.14 (15.83)	88.50 (11.12)	89.59 (2.19)

Discussion

The objective of this study was simply to investigate cognitive style differences and gender differences in sense of classroom community in a blended learning environment.

Differences were found between intuitives and intermediates for the overall measurement of classroom community. Intuitives are individuals whose social orientation is one of seeking company and closeness with others, and this possibly explains why intuitives would be more likely to report lower scores for sense of community than analysts or intermediates in the same environment. For example, intuitives would possibly be more active in trying to establish relationships than analytics or intermediates and therefore would report a lower sense of community than individuals who do not strive to do this.

Also, differences were found between intuitives and intermediates for the spirit subscale. As outlined earlier, Rovai (2001) defines 'spirit' as a feeling of belonging to and acceptance of a group identity, and refers to the recognition of membership of a community and the feelings of cohesion that develop among learners in a group as a result of this. Again, this is consistent with the reasoning that intuitives who generally seek more contact with others would report lower feelings of spirit in the same community or learning group than analysts or intuitives.

It is initially perplexing that cognitive style was not found to be related to the other three subdimensions of the CCI; namely, trust, interaction and learning. However, looking more closely at these dimensions, it is possible to explain why no relationship to cognitive style exists. First, trust measures the degree to which members of the group are prepared to share ideas and information. The learners assessed here were enrolled on a business course with some learners running their own businesses. Accordingly, it would be unlikely that group members would engage in a high degree of trust for sharing business ideas. Interaction is the feeling that community members have that they may benefit by interacting with each other. This refers to the feelings of benefit from interaction and not closeness of interaction. It is plausible that cognitive style may be related to closeness of interaction, but not the feeling of benefit from interaction. Similarly the learning dimension refers to the perceptions that learners have that that they will benefit in terms of learning from belonging to a community, and not sense of community in itself. Therefore, there is little reason to expect that the interaction or learning dimensions will be related to cognitive style.

The results also reveal gender differences, although these differences only reach significance with respect to the interaction subscale, with a difference approaching significance for the trust subscale. For both subscales, females scored higher than males, which is consistent with the results obtained by Rovai (2001) and explained by the fact that the communication patterns of females in learning environments is one of seeking relations and connectedness, whereas male patterns are more autonomous and independent.

The scores for sense of community in this study are lower than those obtained by Rovai (2001). This may possibly be explained by the different courses on which students were enrolled between this study and the Rovai (2001) study. Furthermore, the previous study employed only 20 participants, which would seem to have been a low enough number to promote a high sense of community, whereas in a larger group some participants may have felt anonymous and less a part of the overall group.

One limitation of this study is that it did not investigate why sense of community varied between cognitive styles. Further research is therefore needed using in-depth interviews to establish why such sense of community differences are apparent. A further future research direction could also address the relationship between cognitive style and interaction style in online communication environments assessing examples of discussion board postings.

Conclusion

This study sought to investigate cognitive style and gender differences in sense of classroom community in a blended learning environment in order to identify individual differences in a learner's need for community membership. The results indicate initially that cognitive style is related to sense of community, and this adds support to the utility of this construct as a factor for consideration in the design of blended learning systems.

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Note on Contributor

MARTIN GRAFF is a lecturer in psychology at the University of Glamorgan. He has published in the field of cognitive style and computer-based learning, and has presented his research at E-learning conferences in the USA, Canada and Europe. His research interests include individual differences, cognitive style and the psychology of e-learning. He has recently undertaken a major evaluation project on e-learning in South Wales Colleges.

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