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The Role Culture and Personality Play in an Authentic Online Group Learning Experience

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Abstract

Both educators and students face challenges in successful collaborative work, particularly when students come from a diverse set of backgrounds and cultures. This is especially the case at business schools, which have some of the most diverse student populations in the UK. One explanation for this could be that culture and personality influence behaviour in group work, creating mismatched expectations. This assumption has led to current research focusing upon student reflections and perceptions of these challenges, while few studies objectively explore what influences actual student behaviours in group work. Therefore, this paper describes a learning analytics study of an activity designed to replicate a group learning experience. In a lab environment, 58 students at a UK business school were placed in small groups to work with a Harvard Business School case study using an online chat to communicate with all members of their group. Student contributions were analysed and compared using Hofstede's Cultural Dimensions (Hofstede, Hofstede, & Minkov, 2010) and the Big Five Ten Item Personality Measure (Gosling, Rentfrom, & Swann, 2003). Our analysis suggests that cultural traits in particular influences and can predict student group work behaviours.

Introduction

In the 2013, universities in the United Kingdom hosted over 425,000 international students (HESA, 2014), a number which has dramatically increased over the last decade (OECD, 2014). As the number of international students rise, the need to understand how their learning behaviours are influenced by their diverse backgrounds is becoming more important in order to promote equality and inclusivity at higher education institutions. This is particularly the case at business schools, which have some of the most diverse education faculties. In the UK, for example, a full 36% of undergraduate and postgraduate business students are labelled as international (HESA, 2014).

In the face of these growing numbers, many universities have encountered challenges to integrating international students into the classroom (Strauss & U, 2007; Trice, 2003). From a social perspective, Peacock and Harrison (2009) note a 'passive xenophobia' between international students and host students at UK universities. Much research has also documented difficulties faced by international students in forming cross-cultural connections on campus (see, for example: Gareis, 2012; Williams & Johnson, 2011).

One strategy for incorporating international students into the classroom is the use of group work. After all, group work has also been shown to promote and foster cross-cultural communication (Cruickshank, Chen, & Warren, 2012; Rienties, Heliot, & Jindal-Snape, 2013). In particular roleplaying, where students adopt a role or character that is not their own, can facilitate discussion and collaboration between diverse group members (McLaughlan & Kirkpatrick, 2004; Stewart & Edwards, 2012). In a cross-cultural context, roleplaying can alleviate anxieties and promote freer expression by allowing students to interact outside of what is familiar.

However, group work can also be challenging for students. For instance, Capdeferro and Romero (2012) found that group work participants felt the workload was asymmetric and that groups lacked organisation. Research indicates that group work is particularly challenging when students must work with diverse group members (Rienties, Nanclares, Snape, & Alcott, 2013; Woods, Barker, & Hibbins, 2010). One explanation could be that cultural and personality traits influence human behaviour in group work in different ways, leading to mismatched expectations between group members. After all, current research has demonstrated that learning styles, preferences and motivations are influenced by cultural (Joy & Kolb, 2009; Kim & Bonk, 2002) and personality traits (Keller & Karau, 2013; Komarraju, Karau, Schmeck, & Avdic, 2011), although limited research has looked at these in tandem. In order to test this notion, therefore, we aim to use Hofstede's Cultural Dimensions and the Big Five Personality Dimensions to analyse the influence of cultural and

personality traits on student contributions to group work, based on a lab activity participated in by 58 business school students involving a Harvard Business School case study.

Cross-Cultural Group Work

Studies have found that cross-cultural group work is an important tool in increasing understanding between diverse students in the classroom. For example, Rienties, Alcott, and Jindal-Snape (2014) found that student knowledge exchanges and cross-cultural friendships increased when students were placed randomly in groups with peers from other cultures. Levin (2005) also argues that cross-cultural group work allows participants to encounter and evaluate new ideas and values. In a business school context, Robinson (2006) found cross-cultural group work to be a positive real-world exercise that can prepare students for work in the international business sector. These findings are important, especially as it has been argued that some business school students lack the cross-cultural communications skills necessary for success (see, for example: Aggarwal & Gooddell, 2014).

Despite this, some students have demonstrated negative feelings towards cross-cultural group work. For instance, multiple studies have highlighted that students prefer to work with group members from their own cultural background (Strauss, U, & Young, 2011; Summers & Volet, 2008; Volet & Ang, 1998). One explanation for this might be that students tend to generalise group members' attitudes and behaviours based on cultural stereotypes (Moore & Hampton, 2015). Other explanations may stem from a number of perceived problems associated with cross-cultural group work, including unequal sharing of the workload (Capdeferro & Romero, 2012), mismatched understanding of academic requirements (Moore & Hampton, 2015), language barriers (Moore & Hampton, 2015; Popov et al., 2012), and lack of communication between members (Hannon & D'Netto, 2007). However, current research on this topic tends to focus on student reflections and perceptions of the issues, whereby few studies have looked objectively at how cultural backgrounds and attitudes in cross-cultural settings influence actual behaviour.

Current research, thus, has identified two conflicting viewpoints. On one hand, group work has been shown to positively influence learning and promote cross-cultural understanding in diverse classrooms. On the other hand, some students report negative feelings towards cross-cultural group work. One explanation could be that cultural and personality traits lead to different kinds of contributions to group learning activities, causing tension between group members. Indeed, studies have suggested that students participate in group work in different, and often unequal, ways (Hou & Wu, 2011; Stribos & Laat, 2010), although the reasons behind this are not yet fully understood.

Students' frustrations with cross-cultural group work might be avoided if they (and their instructors) have more realistic expectations at the start of their projects about the types of contributions that their culturally diverse peers naturally gravitate towards in group work. However, limited research has been conducted on the predictive power of culture and personality traits on group work contributions. Therefore, we aim to objectively measure this by utilising two quantitative instruments: Hofstede's Cultural Dimensions and Big Five Personality Dimensions.

Hofstede's Cultural Dimensions

Hofstede et al. (2010, p. 5) define culture as, 'the collective programming of the mind which distinguishes the members of one group or category of people from another.' Culture, they argue, can be represented by a set of six dimensions: Power Distance Index, Individualism versus Collectivism, Masculinity versus Femininity, Uncertainty Avoidance Index, Long Term Orientation versus Short Term Orientation (sometimes simply called Pragmatism), and Indulgence versus Restrain. A description of each dimension can be found in Table 1.

Hofstede's work on culture is rooted in the business world, as he initially conducted a cross-cultural study on the behaviours of 116,000 employees at IBM. However, Hofstede's Cultural Dimensions have now been used extensively in educational research (see, for example: Cronje, 2011; Sanchez-Franco, Martinez-Lopez, & Martin-Velicia, 2009). For instance, Popov et al. (2012) found that students from countries with higher Individualism scores rated cross-cultural group work challenges to be more profound. Similarly, Holtbrugge and Mohr (2010) found that Individualism and Masculinity scores significantly correlated with student learning style preferences. Although few studies have compared Hofstede's Cultural Dimensions with actual student behaviours in group work, we hypothesise based on these previous studies that cultural dimensions will also influence the types of contributions that participants in our study make to group work.

One criticism of Hofstede's model is that it may over-generalise the complexity of culture (McSweeney, 2002). Therefore, we also adopt the Big Five Personality Dimensions to analyse student behaviour. After all, culture, as measured in this study by Hofstede's Cultural Dimensions, captures broad, macro-level influences (Hofstede et al., 2010) while personality, as measured by the

Big Five Personality Dimensions, captures more individual, micro-level influences (McCrae & John, 1992). At present, little research has used these two instruments together to study student attitudes and behaviours.

Table 1: Hofstede's Cultural Dimensions

Cultural Dimension	High Score	Low Score
Power Distance Index	Centralised power; Strong hierarchies; Large gaps in levels of authority or respect; Dependency on leaders; Submission to authority	Flatter organisations; Equality among members; Stronger emphasis on teamwork; Many people involved in decision-making; Inequalities minimised
Individualism vs Collectivism	Focus on 'I'; Debate encouraged; Free expression of ideas; Expectation to speak up	Focus on 'We'; Group harmony more important than honesty; Avoidance of direct confrontations
Masculinity vs Femininity	Ego-oriented; Conflict resolved through force; High value of successful performance	Relationship-oriented; Conflict resolved through negotiation; Emphasis on quality of life
Uncertainty Avoidance Index	Preference for structure; Differences avoided; Resistance to change; Formality in interactions with strangers	Openness to change; More comfortable with unstructured situations; Informality in interactions with strangers
Pragmatism	Focus on the future; Willing to delay immediate gratification; Persistence valued	Focus on the present; Care more about immediate gratification; Quick results valued
Indulgence vs Restraint	Free gratification of desires; Leisure time important; More positive and extroverted	Believes desires should be curbed; Leisure time less important; Less positive; More cynical

(Hofstede et al., 2010)

Big Five Personality Dimensions

Feist and Feist (2009, p. 4) describe personality as a 'pattern of relatively permanent traits and unique characteristics that give both consistency and individuality to a person's behaviour.' One commonly used theory to measure personality is the Big Five Personality Dimensions. This measurement highlights five major traits of individual personality: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience (John & Srivastava, 1999). A summary of the Big Five Personality Dimensions can be found in Table 2.

The Big Five Personality Dimensions have also been extensively used in educational research (see, for example: Nofhle & Robins, 2007; O'Connor & Paunonen, 2007). For instance, Zhang (2003) found that high Conscientiousness and Openness to Experience traits could predict students' learning approaches. Chamorro-Premuzic, Furnham, and Lewis (2007) also found that Big Five Personality Dimensions could predict students' teaching method preferences, including whether they enjoyed contributing to group work. Based on previous studies, we therefore hypothesise that personality traits will also influence student behaviours in group work.

Table 2: Big Five Personality Dimensions

Big Five Dimension	High Score	Low Score
Extraversion	Enjoy interacting with others; Energetic; Enthusiastic; Assertive; Talkative	More socially reserved; Quiet; Low-key
Agreeableness	Concern for social harmony; Values getting along with others; Generous; Willing to compromise for others	Value self-interests over getting along with others; Uncooperative; Suspicious; Unconcerned of others' well-being
Conscientiousness	Self-disciplined; Aims for achievement; Preference for planned activities; High control of impulses	Impulsive; Can more easily handle spontaneity
Emotional Stability	Tolerance to stress; Calm; Less easily upset; Less burdened by negative thoughts	Low tolerance to stress; Easily upset; Has more negative thoughts; Higher anxiety
Openness to Experience	Intellectually curious; Emotional; Willing to try new things; Imaginative; More liberal	More conventional or traditional; Straightforward; Prefers familiarity; Resistant to change; Conservative

(John & Srivastava, 1999; McCrae & John, 1992)

Research Questions

Given the gaps in current knowledge about the influences of culture and personality on group work contributions, we aim to address the following research questions in this study:

- How do cultural and personality traits influence the types of contributions that students make in group work?
- To what extent can students' cultural and personality traits predict the type of contributions they will make in group work?

Methods

Setting and Participants

This learning analytics study took place in an organisational behaviour Master's level module, at a UK university business school with students from multiple academic programmes. Altogether 58 students from 13 countries took part in the study. In the descriptive statistics in Table 3, we have arranged participants based upon the geo-cultural classifications of the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) programme (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

Table 3: Descriptive Statistics of Participants

Variable	N	%	Variable	N	%
Gender			Region of Origin		
Male	17	29	Anglo-Saxon	3	5
Female	41	71	Latin Europe	3	5
Age			Nordic Europe	1	2
21-23 years	26	45	Eastern Europe	1	2
24-26 years	22	37	Sub-Saharan Africa	1	2
27-30 years	5	9	Middle East	2	3
Older than 30	5	9	Southern Asia	11	19
			Confucian Asia	36	62

Procedure

We used a Harvard Business School case study (Skinner & Beckham, 2008) to replicate an authentic online learning activity in a computer lab setting. In this case study, a tyre company was faced with the problem of high worker turnover. The case study package includes a variety of information and data about the company and its workers. Participants in this study took part in a one-hour lab activity, where they were required to provide a solution to the problem presented in the case study. As group work is shown to be a useful tool for cross-cultural collaboration (Cruickshank et al., 2012; Rienties et al., 2014), participants were assigned to small groups of 3 to 5 members upon arrival to the lab. Participants were assigned to groups at random in order to mimic a real world experience where they must work with diverse group members. Because the literature also highlights that roleplay can further encourage group collaboration (McLaughlan & Kirkpatrick, 2004; Stewart & Edwards, 2012), participants were instructed to roleplay that they were each members of an international consulting agency tasked to work with colleagues around the world. Participants were given a specific computer which was not adjacent to any of their fellow group members and were instructed to use an online chat as their sole means of communication. Each participant was given one sheet of identical information that described the problem stated in the case study. Next, each group member was given a set of unique information related to the problem to which other group members did not have access. Students were made aware that each group member did not have the same information in order to incentivise collaboration. After a brief reading period of approximately 20 minutes, group members were instructed to log into the online chat to collaborate to determine one best solution to the problem. Participants were additionally asked to make explicit connections in their conversations to theories recently discussed in their module. After 40 minutes of online discussion, students were instructed to provide a final solution in the chat to complete the task. This activity was built into the module schedule, but attendance was not required and no marks were given.

Instruments

Cultural dimensions

In order to measure participants' cultural traits, demographic information about participants' countries of origin was retained and converted using Hofstede's Cultural Dimensions scales, as demonstrated in previous research (Holtbrugge & Mohr, 2010; Popov et al., 2012)

Big Five Personality

To measure the Big Five Personality Dimensions, participants were given the Ten Item Personality Inventory (TIPI) (Gosling et al., 2003) at the start of the lab activity, which is a brief survey of only 10 items that can be administered to participants in a relatively short timeframe. All participants in this study completed the TIPI survey, providing a response rate of 100%. Previous research has found that TIPI is a reliable instrument to measure Big Five traits (Jonason, Teicher, & Schmitt, 2011). However, we found the Cronbach alphas to be relatively low for some of TIPI's scales in this study, including Agreeableness ($\alpha = .011$), Conscientiousness ($\alpha = .142$) and Emotional Stability ($\alpha = .390$). One explanation for this inconsistency could be that most participants spoke English as a non-native language, and that a language barrier skewed participants' responses to questions related to these scales. Nevertheless, the Cronbach alphas for Extraversion ($\alpha = .566$) and Openness to Experience ($\alpha = .690$) did indicate reasonable reliability, therefore only these dimensions were used in analysis.

Discourse in online chat

We looked at several characteristics of individual student contributions to the online chat. Firstly, we considered the total number of posts made. Because some participants opted to write many short messages while other students contributed fewer, longer messages, we also considered the total summed word count submitted by each student. Next, we manually coded each post based on whether it contained a reference to the case study information provided. We concluded that a reference was made if the post included a citation to information in the case study text given to students. An example of a case information reference is:

'Since employees at Lima worked a 12-hour shift with two breaks and only got half-hour for meal, maybe high pressure and dissatisfaction became the main cause in turnover.'

Data Analysis

Participants' Hofstede and TIPI scores were analysed using bivariate tables to determine if cultural and personality traits significantly correlated to behavioural traces, including the number of posts, summed word count submitted, and number of case information references. Next, stepwise regression analyses were conducted to determine the predictive power of cultural and personality traits on student contributions. Due to the relatively small sample size and thematic relation between some cultural and personality traits, we opted to conduct a stepwise regression in order to avoid risking degrees of freedom or autocorrelation.

Results

Altogether 621 posts were made during the 40-minute discussion period. On average, participants contributed 10.71 chat inputs each. High variance (SD = 9.24) was demonstrated in total post counts, which is in line with previous findings (Strijbos & Laat, 2010). However, nearly all participants posted at least 2 messages, while 41% of participants posted at least 10 messages. The most frequent poster sent 52 messages (a female participant from Portugal, which has a low Individualism score and high Femininity score, and had high Extraversion and Openness to Experience scores), while two participants posted no messages at all during the activity (a male and female from China, which has a low Individualism score and high Masculinity score, who both had high Extraversion and Openness to Experience scores). The average summed word count for participants was 110.14, again with high variance (SD = 94.48). 126 total case information references were made during the activity, equalling 20.28% of posts. The average participant made 2.17 case information references (SD = 2.16).

In order to analyse students' contributions, we first conducted bivariate analysis using Pearson's *R* to compare Hofstede's Cultural Dimensions and Big Five Personality Dimensions with behavioural traces, including the number of posts made, the total word count submitted, and the number of case information references made (summarised in Table 4). The number of posts moderately to strongly and positively correlated with Individualism, Masculinity, Uncertainty Avoidance and Indulgence, while negatively correlated with Masculinity and Pragmatism. This seems to indicate that culture does indeed play a role in the types of contributions students make to group work. Similarly, the summed word count positively correlated with Individualism, Uncertainty Avoidance and Indulgence, while negatively correlated with Masculinity and Pragmatism. Finally, the number of case information references significantly correlated positively with Individualism. However, neither of the two personality dimensions correlated with any of the behavioural traces analysed.

Table 4: Correlation analysis of culture, personality, and student chat contribution traits

Dimension	Number of posts	Summed Word Count	Number of Case Information References
Hofstede			
Power Distance Index	-.209	-.161	-.041
Individualism vs Collectivism	.325*	.413**	.275*
Masculinity vs Femininity	-.393**	-.450**	-.135
Uncertainty Avoidance Index	.533**	.357**	.172
Pragmatism	-.403**	-.355**	-.090
Indulgence vs Restraint	.332*	.333*	.086
Big Five Personality			
Extraversion	.036	.099	.072
Openness to Experience	.179	.169	.155

* $p < .05$

** $p < .01$

Next, we conducted a stepwise regression analysis with the number of posts as the dependent variable. This showed two predictors, which explained 30.3% of the variation: Hofstede's

Uncertainty Avoidance ($\beta=.490$, $p = .000$) and Individualism ($\beta=.301$, $p = .010$). The regression was then repeated using the total word count sum as the dependent variable. This analysis showed two predictors, which explained 25.5% of the variance: Hofstede's Masculinity ($\beta= -.419$, $p = .001$) and Individualism ($\beta=.329$, $p = .007$). Finally, the number of case information references was used as the dependent variable. This time, only Hofstede's Individualism ($\beta=.247$, $p = .039$) was a predictor, explaining 5.9% of the variance. Neither Extraversion nor Openness to Experience were predictors for any of the behavioural traces analysed. Additionally, we compared results by gender and age in all three regression analyses, but found no statistically significant differences.

Discussion

Our first research question looked at the influence of culture and personality on students' online behaviours in group work. Our correlation and regression analyses together suggest that cultural traits have a powerful influence on the types of contributions that students make to online group work. Indeed, our analysis demonstrates that the number of posts, summed word count submitted, and case information references all correlated with culture. These findings provide a potential root cause for previous studies that highlight frustrations with cross-cultural group work (Strauss et al., 2011).

However, the same was not true for personality traits in this study. The two dimensions that were reliable, Extraversion and Openness to Experience, did not correlate with any of the behavioural traces analysed in this study. This draws into question whether cultural traits are more influential on student behaviours than personality traits. However, a replicated study with a more reliable measure of Big Five Personality Dimensions would be needed to truly determine this.

Our second research question considered the power of students' cultural and personality traits to predict student behaviours in group work. In this study, Hofstede's Cultural Dimensions were indeed predictors of student behaviours in group work. When we consider the number of posts, for instance, Uncertainty Avoidance and Individualism scores could predict a full 30.3% of the variance between students. This may be due to several reasons. For instance, students from cultures with high Uncertainty Avoidance scores may be more apt to send more posts in order to clarify expectations or ask questions. However, students from cultures with high Individualism scores may post more due to increased comfort with free expression. Textual analysis (e.g. data mining, semantic analysis) or qualitative interviews would be useful to validate these assumptions in the future.

The summed word count was similarly predicted by Hofstede's Masculinity and Individualism scores in regression analysis, accounting for 25.5% of the variance between students. Again, this may be due to several reasons. Our analysis indicated that more feminine cultures were more likely to post more words. One explanation could be that feminine cultures better facilitate negotiation, leading students to contribute more in order to find a common solution. As with the number of posts, students from cultures with higher Individualism scores may feel more comfortable with expressing their ideas. These two findings are supported by the literature, which found Individualism and Masculinity scales to positively correlate with student learning style preferences (Holtbrugge & Mohr, 2010).

Finally, the regression analysis showed Hofstede's Individualism is a predictor for case information references, but it explains only 5.9% of the variance between students. One explanation for this lower percentage could be that Hofstede's Cultural Dimensions are more powerful predictors for students' physical contributions (i.e. behaviour) to online group work compared to conceptual contributions (i.e. cognition). However, a more in-depth contextual analysis would be necessary to confirm this. Personality traits, on the other hand, were not shown to predict student behaviour in this study. This is interesting, considering Openness to Experience has previously found to predict students' learning approaches (Zhang, 2003).

Conclusion

In this paper, we used Hofstede's Cultural Dimensions and Big Five Personality Dimensions to compare the behaviour of individual students in an authentic online group learning activity. In doing so, several limitations of this study are recognised. Firstly, this study was conducted on a relatively small sample size in just one university module. In order to confirm these findings, replication in other settings will be important. Secondly, this study looked specifically at postgraduate students and there is potential that results could differ when replicating the study with undergraduate students, who may be less confident in their problem-solving meta-knowledge and abilities in group work.

However, our findings suggest that students' contributions to group work can be predicted, particularly based on cultural traits. This suggests that interventions can help prevent student frustrations and promote more equal participation in group work. For instance, additional scaffolding may be helpful at the start of projects to inform students how their own and others' cultures influence group participation. As culture correlates with amounts of contributions, role assignments may also

encourage more equal contributions, as demonstrated in previous studies (Schellens, Van Keer, De Wever, & Valcke, 2007). Perhaps most importantly, these results further validate the notion that students' diverse backgrounds are important influences on their behaviours in the classroom, and that educators should consider this when designing classroom activities.

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