

Students' Cultural Perception towards the design of the ICDM

Zahari Hamidon
Dept of Educational Foundations,
Sultan Hassanal Bolkiah Institute of Education,
Universiti Brunei Darussalam,
Brunei Darussalam
zham@shbie.ubd.edu.bn

Abdullah Md. Noor
Dept of Educational Foundations,
Sultan Hassanal Bolkiah Institute of Education,
Universiti Brunei Darussalam,
Brunei Darussalam
abdull@shbie.ubd.edu.bn

Raja Maznah Raja Hussain
Dept of Curriculum and Instructional Technology
Faculty of Education
University of Malaya
Kuala Lumpur
Malaysia
rmaznah@um.edu.my

Abstract

The use of interface design elements in Interactive CD-ROM-based Instructional Material (ICDM) has affected students' cultural perception towards the design of the ICDM. This has an influence on how the students perform the task provided in the ICDM. This paper will report on the study to determine the effects of interface design elements on cultural perceptions of students from different ethnic groups. Data was collected using the usability study technique from students of the Universiti Brunei Darussalam.

Keywords

Interface design elements, cultural perceptions, sociological impact.

Introduction

CD-ROM-based Instructional materials (ICDM) are widely used by teachers and students at all levels of education, ranging from kindergartens to higher education institutions. The implementation of information and communication technology (ICT) in teaching and learning in the classroom has wholly changed the way of teaching and learning in the classroom. The widespread of ICT usage in teaching and learning has been seriously put into action. At the micro level, The Planning, Research and Development Department, Ministry of Education, Brunei Darussalam has conducted the 80 hours training for the key personnel namely 'Integration ICT Across School Curriculum for Government Secondary and Primary Schools from 14 July 2003 to 23 October, 2003.

Laila Rahman (Borneo Bulletin, Mei, 22, 2005) reported that about 30% of ICT usage has been initiated in the Lower Curriculum since 2004, while in 2005, the ICT subject has been introduced as one of the subjects in the Vocational Secondary Curriculum.

In other report by Laila Rahman (Borneo Bulletin, Mei, 22, 2005) reported the speech by Director of Information Technology, Ministry of Education, Awg Hj Abdul Ghani bin Hj Omar in the ceremony of signing of the contract agreement of four e-education projects between Ministry of Education and Universiti Brunei Darussalam, who mentioned that there were about six projects valued at about B\$18 million that had been approved and that would be implemented. Two projects involving the supply of "Interactive Whiteboard" to every school, college, high education institution and religious school in the country which is valued at B\$3,057,698.93.

As a teacher, they sometimes use ICT not only to analyzed the information to be used as their instructional material, but they also use ICT as a tool to develop their own instructional materials which are interactive in nature and are store in the CD ROM. In order to have an effective instructional product especially when it deals with ICT application, one of the important factors we have to consider is the delivery system. Pallot and Pratt (2001) who stated about the successful delivery in online class rest not with the content but with the method by which the course is delivered. The effectiveness depend on the usage where interactivity is believed can deepens the learning experience and create a more satisfying outcome.

Research Background

Many researchers from various backgrounds in social sciences are now studying the social aspects of human-computer interactions. This involves analyzing how people communicate with each other and how they interact with the variety of artifacts that constitute their work environment (Preece, Rogers, Sharp, Benyon, Holland, & Carey, 1994).

Interface design element in ICDM product is universal and is acceptable to most learners of different ethnic groups. According to Rubin (1994a) in the past, product development has focused more on the machine or system, rather than the person who is the ultimate end user. Thus, there is a need to consider the end users in designing the interface design element in ICDM product.

Social values and Interface design

Preece et. al. (1994) stated that usability, a key concept in Human Computer Interaction (HCI) is concerned with making systems easy to learn and easy to use. Poorly designed computer system can be extremely annoying to users. One of the social factors that plays an important role in producing computer system with good usability has been stated to be in one of the three components is the factor of understand (such as psychological, ergonomic, organizational and social factors) that determine how people operate and make use of computer technology effectively, and to translate that understanding into the development for better achievement in terms of both individual and group interaction.

According to Gunter, Estes, & Schwab (1990) no matter how interesting or relevant the material may be or how enthusiastic the teacher is about the subject, learners must be able and willing to learn. If teaching does not result in learning, then it fails. Baylor (2005) stated that from the perspective of interface, it is critical to consider the desired outcome of the learning for the pedagogical agent within the learning environment. Pedagogical agent is referred as an animated life-like characters designed to facilitate learning in computer-mediated learning environment. More research is needed that consider both learner/user factors (e.g. Gender, ethnicity) together with interface features.

Sometimes the roles of color reflect the culture in terms of its representation. According to Carrol (2003), the aspects of data displays that are based on our sensory apparatus will be easily transferred across cultures. For example, the colors such as red, green, yellow and blue are a useful set of color codes in all cultures. The same colors will stand out for everyone. However, the semantics of the colors, such as the connotations of “red” will vary widely, in one society red may represent a warning of danger, and in another it may represent good fortune.

According to Baylor (2005) that mentioned on design guidelines for pedagogical agent interface image, it is critical to first consider the desired outcome for the pedagogical agent within the learning environment. Allowing students/users to make the choice of what they perceive as ‘best’ risky (e.g., students may tend to choose agents of the same ethnicity, yet may learn more from agents of diferent ethnicity).

Brunei Darussalam is small in size and rich in its cultural diversity and variations within its population and migrant population. There are cultural variations within the Bruneian population. The Bruneian population consists namely Malay, Kedayan, Tutong, Belait, Bisaya, Dusun, Murut, Iban, Kelabit and Chinese. There are also other temporary workers from various countries in the world (some 80,000 almost 23% of the total population (344,500 estimated in 2001).

According to gender, the population consists of 53% male and 47% female. There are also sub-cultures co-existing within a culture such as rural, urban, water-village culture, rich, well to do and poor. These data show cultural diversity in Brunei Darussalam that students from various cultures and sub-cultures bring to their classes that influence the teaching and learning processes in the school. (Dhinsa 2002:15).

Analysis of research in the area of cultural dimensions that may be important to influence the teaching and learning processes revealed that the works of Moos (1979) and Hofstede (1984) are worth considering... (Dhinsa 2002:15).

Interface design elements

Principles of Screen Design

In order to identify the effects of color and graphics on interface elements to the user, Gestalt Law Theory for Computer Screen Design is used as a guideline in designing our instrument. The principle in this theory comprise of:

1. Law of Balance/Symmetry
2. Law of Continuation
3. Law of closure
4. Law of Figure-ground
5. Law of Focal point
6. Law of Isomorphic Correspondence
7. Law of Pragnanz (Good form)
8. Law of Proximity
9. Law of Similarity
10. Law of Simplicity
11. Law of Unity/Harmony

The Gestalt Law Theory for Computer Screen Design are used as the foundations for instructional screen design and generally accepted that the theory maybe used to improve educational screen design and there by improve learning (Preece, et. al. 1994). Chang, Dooley and Tuovinen (2002) reported that this theory was used to suggest how static visual elements should be presented in order to achieve effective visual results. In their findings, they concluded that the user evaluation on Multimedia Screen Design: WoundCare, the entire identified Gestalt Laws are beneficial for visual screen design and learning effectiveness.

Screen design is part of interface design in the field of HCI. The method of usability evaluation is often used to evaluate the interface design. Hilbert and Redmiles (2000) define usability evaluation as the act of measuring usability attribute of a system or device with respect to particular users, performing particular tasks in particular context. The five usability attributes (Nielsen, 1993) that is useful as a point of reference are:

1. Learnability
2. Efficiency
3. Memorability
4. Errors
5. Satisfaction

Screen design

According to Wilding (1998) the screen elements in the screen design are the controls with which the user interacts and accesses functionality. Graphic design details are not cosmetic matter or decorative touches, but an aid to communication. He suggested three factors should be considered in the design process;

1. Screen layout is about communication and usability, not making a screen 'pretty'
2. Avoid emotional decisions or those based on personal preferences
3. Often design decisions are in favour of usability or software/hardware constraints

The existence of interface design elements such as colors, animation, videos, images, dialog boxes and sound are important factors for us to look into. Hooper et al. (2002) concluded that effective screen design appears to be "as much art as science" are to be taken into consideration in order to produce an effective screen design. The researchers also stated that, although several authors have generated screen design guidelines, empirical evidence supporting this advice has been scarce.

Task

The task that has to be carried out by the user is one of an important factor to be considered by the designer of an interface designer. In terms of the user action the perhaps the closest definition that can be considered is a Control Task Analysis (CTA) by Sanderson (2003) who defined CTA as what needs to be done for a work domain to be effectively controlled. However, if we look at in the perspective of instruction, Mager (1995) defined task as a series of steps leading to a meaningful outcome. Every job is made up of a collection of tasks. Each of the tasks has a beginning and an end with the steps in between. Rubin (1994) who discussed on usability studies stated about the task that he called as task scenarios as a representations of actual work that the participants would conceivably perform using the products.

In this study, the task we are looking at is any task run by the user that has been affected by their cultural values. The usability studies that is conducted in this study is to determine the cause and effect of the element of interface design to the task since one of the design criteria questioned by Wilding (1998) on usability is can users easily learn and effectively interact with the system?

A definition on Usability by Wilding (1998) has highlighted three main areas to be considered in designing interface design:

1. Making the technology transparent
2. Providing optimum access to functionality
3. Focusing on the task in context.

Objective of the Study

The purpose of this study is to investigate the effects of interface design element on students from different ethnic groups specifically to investigate the effects of colors and graphics on the users (students).

Research questions

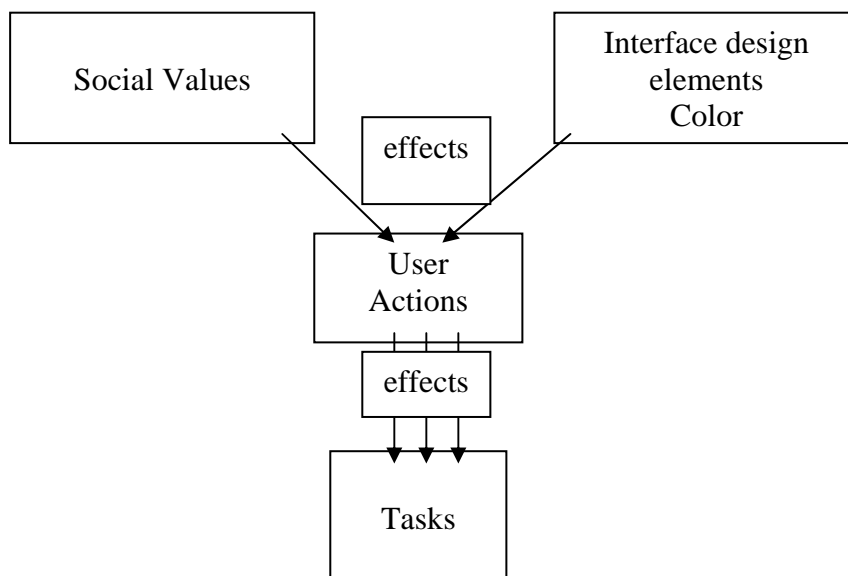
This research seeks to find answers to the following questions:

1. What are the effects of color elements in the ICDM products on students of various ethnic groups?
2. Does the design have any effect on the task to be performed by students in different ethnic groups?

Methodology

This study uses a causal relationship method of three sections (as in Figure 2) comprising of color as one component of interface design element which is an independent variable and social values as dependent variable and the task as the effect of the user actions. Both independent and dependent variables were analyzed to get the correlation values that might affect the user actions that can be indicated as the task. Consequently, the correlational values are expected to either affect or not affect the task expected by the users.

Figure 2. Research Design



To address the two research questions, we have conducted the usability studies on 86 students. The students are required to give a response while reviewing the ICDM given to them. The data are then analyzed using Microsoft Excel and SPSS Ver. 12 that reveals the findings.

Sample

The profile of the respondents are as shown in Table 1. The distribution of ethnic group shows that the most dominant group is Malay (57%) and the second dominant group is the mixed (32%) and Chinese (3%) while only 1% in Tutong and Kedayan.

Table 1: Distribution of ethnical group

Ethnic groups	N	Percent
Malay	49	57
Mixed	32	37
Tutong	1	1
Chinese	3	3
Kedayan	1	1
Total	86	100

Analysis of Data

Chang et.al. (2002) who has conducted a survey on evaluating screen design has suggested three main steps:

1. redesigned the screen design of the particular program
2. Conduct the survey to two group of participant
 - a. Experience user
 - b. Unexperience user

They conducted the informal interviews and observations for the participants to compare two program (the original program and the modified program), then the participants completed the questionnaires. In their method, they used Gestalt Laws of screen design to determined the usefulness of the laws in screen design. This process gives the direct information about the comparative value of the eleven laws for educational screen design. There were also questions asked to the evaluator to estimate how beneficial the specific Gestalt principles were in student learning.

As a result of their study, they found that the user evaluations indicate that all the identified Gestalt Laws are beneficial for visual screen design and learning effectiveness. However, they are not recognized to be uniformly beneficial for learning an design improvement.

The analysis of data revealed an overall pattern of responses that enable us to determine several items that can be used to answer both research questions. To answer the first research question, do the color elements in the ICDM product have an effect on the social values of students from different ethnic groups? We first performed the cross tabulation analysis to examine the effect of the favorite color to the values of personal, culture and emotion.

Gestalt Law and Usability Attribute

Gestalt Law of Computer Screen Design (Chang et.al. 2002) is used to identify the user reactions on color as one of the interface design elements in relation to their ethnical reactions on color provided in the product.

User Actions

The purpose of user interface (UI) events in Techniques For Synchronization And Searching (Hilbert and Redmiles, 2000) is to provide detailed information regarding user behavior that can be captured, searched, counted and analyzed using automated tools.

Results and Discussion

The overall result in Table 2 shows that the subject's favorite colors reflect their personal values rather than the cultural values and emotion. The personal values has stated the highest percentage with 75.9% (n = 63), while Emotional values stated 18.1% (n=15) and cultural values which has the lowest score has stated only 6.0% (n=5).

Blue color (refer to Appendix 1) seems to be a favorite color compared to the other colors (n=63, 75.9%) and it has been stated as the highest percentage in reflecting the personal values. Red and green colors (refer to Appendix 1) has the greatest influence to the cultural values that shows 40.0% of the responses, while blue color only stated 20% and none for white and black.

Blue color (refer to Appendix 1) has stated the highest percentage (73.3%) in reflecting the emotional values, while green and white colors has stated 13.3% of the responses and none for red, yellow and black.

Table 2: Favorite colors representation

	Color representation			Total
	Personal	Culture	Emotion	
n	63	5	15	83
% within Favorite color	75.9%	6.0%	18.1%	100.0%
% within Color representation	100.0%	100.0%	100.0%	100.0%
% of Total	75.9%	6.0%	18.1%	100.0%

Table 3 shows that there is a strong correlation between favorite color and personal ($r = 0.99763$), and between favorite color and emotion ($r = 0.87571$) but a weak correlation between favorite color and culture ($r = 0.29027$). The weak correlation between the favorite color and culture shows that the colors in the ICDM does not give a great influence to the ethnical group, however it has a big influence on personal and emotional values.

Table 3. Correlation between Favorite colors and representation of personal, culture and emotion

	Personal	Culture	Emotion
Favorite color	0.99763	0.29027	0.87571

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows that the most dominant color that has been selected by the subject is Blue ($N=55$ (43.7%)) with red ($N=14$ (11.1%)) and yellow ($N=3$ (2.4%)), Green ($N=7$ (5.6%)), Black ($N= 3$ (2.4%)) and Brown ($N=3$ (2.4%)).

Table 4: Frequency table for the most dominant color

	n	Percent
Blue	55	43.7
Red	14	11.1
Yellow	3	2.4
Green	7	5.6
Black	3	2.4
Brown	3	2.4
Total (N)	85	67.5

Table 5 shows the responses given to the most dominant colors. Most of the responses are on strongly disagree and disagree that means the most dominant colors seems to be not an important factor in influencing the ethnical values.

Table 5. The most dominant color (figure)* related to ethnical culture (figure) Cross tabulation

		Related to ethnical culture(figure)					Total	
		*	SD	D	SA	A	SA	
Total	n		18	31	18	10	5	82
	% within The most dominant color		22.0%	37.8%	22.0%	12.2%	6.1%	100.0%
	% within Related to ethnical culture(figure)		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total		22.0%	37.8%	22.0%	12.2%	6.1%	100.0%

*SD – Strongly Disagree D- Disagree SA- Slightly Agree A- Agree
SA – Strongly Agree

The effect of the ground color also is likely the same to the effect of the foreground color. Most of the responses are on strongly disagreeing and disagree.

Table 6. The second dominant color * Related to ethnical culture (ground) Cross tabulation

		Related to ethnical culture (ground)					Total
		SD	D	SA	A	SA	
	n	17	29	16	15	7	84
	% within The second dominant color	20.2%	34.5%	19.0%	17.9%	8.3%	100.0%
	% within Related to ethnical culture (ground)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	20.2%	34.5%	19.0%	17.9%	8.3%	100.0%

Table 7. Correlation of the most dominant figure and ground and effect to ethnical culture

		Related to ethnical culture(figure)	Related to ethnical culture (ground)
The most dominant color (figure)	Pearson Correlation	-.058	-.223(*)
	n	82	84
The second dominant color (ground)	Pearson Correlation	.117	.005
	n	82	84

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 7 shows that there is a slight negative relationship between the most dominant color (figure) and Related to ethnic culture (figure) ($r = -.0580$) and Related to ethnical culture (ground) ($r = -.223$). There appears to be little or no relationship between the second dominant color (ground) and the ethnical culture (figure) ($r = 0.117$), nor between the second dominant color (ground) and the ethnical culture (ground) ($r = 0.005$). This shows that either the figure or the ground does not affect the ethnic culture.

Research question 2.

Does social value in the interface design elements in the ICDM product have an effect on the task that has to be performed by students of different ethnic group?

The overall mean ratings by treatment to the five likert-type items on the effect of colors on the Usability Attributes according to the particular items are stated in Table 8.

The students rated the item “I believe that some of the colors reflect my culture” and “The overall system in this product has low error rate” lower than the other items.

Table 8. Distribution of mean and standard deviation of Usability Attribute compared to item on colors that reflect the cultural values.

	N	Minimum	Maximum	Mean	Std. Deviation
I believe that some of the colors reflect my culture	86	1.00	5.00	3.3256	.95106
The components on the design easy to learn and understandable	86	1.00	5.00	4.2442	.75047
The overall system in this product is efficient to use	86	1.00	5.00	4.1395	.75401
The overall system in this product is easy to remember	85	1.00	5.00	4.0941	.79617
The overall system in this product has low error rate	85	1.00	5.00	3.6118	.95237
I am satisfied with the whole delivery system provided in this product	82	1.00	5.00	4.1098	.75369

Table 9 shows that, overall there is too little relationship between most of the items in the Usability attribute and the student's believe in colors that reflect their ethnical culture. Most of the first three Usability Attribute in Table 9 shows too little correlation, whereas the last two shows almost no correlation. So, if we look at the correlational values at the first three Usability attributes, it shows that the colors that reflect the students' ethnical values does affect their learning task however, the t values that shows the relationship between the usability attributes and student's believe in colors that reflect their ethnical culture shows that there is a weak and almost no evidence of their relationship.

Table 9. Correlation of effects of colors on culture and usability attributes

Usability attribute	I believe that some of the colors reflect my culture		
		t	df
The components on the design easy to learn and understandable	.184	-7.760	85
The overall system in this product is efficient to use	.198	-6.924	85
The overall system in this product is easy to remember	.164	-6.291	84
The overall system in this product has low error rate	.072	-2.088	84
I am satisfied with the whole delivery system provided in this product	.020	-6.012	81

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Conclusion

The analyses clearly suggest that despite no relationship between the colors and the ethnic values. There is a little or almost no evidence showing the relationships between the usability attributes and the student's believe in colors that reflect their ethnic culture, the data yields five outcomes.

1. The color that does not affect the cultural values does not affect their learning task.
2. The colors that affect the personal and emotional values do not affect the learning task.
3. The learning task can be affected by the students' favorite colors in its relationship to their ethnical cultural values ($r = 0.29027$) (refer table 3.)
4. The relationship can be seen between colors and personal values and
5. The relationship can be seen between colors and emotional values.

Suggestions

As a conclusion, in the process of designing the interface design in ICDM the designers has to consider two factors on colors

1. The most favorite colors indicate their emotional and personal values more than cultural values.
2. The designer have to understand the culture before employing, choosing, adapting and intergrating the colors in interface design in ICDM.

Further Research

This study is focusing on effects of color as one of main element in interface design to the ethnical culture, due to its possibilities to affect the learning task. More focus should be made on other interface design elements such as images, text, videos, sound and animation.

Reference

Abdullah Mohd Noor (in print) Teaching Thinking Skills in the Classroom: Changes and Constraints.

Baylor, A.L. (2005). Preliminary Design Guidelines for Pedagogical Agent Interface Image. Proceedings of the 10th international conference on Intelligent user interfaces, January 9-12, 2005. California, U.S.A.

Chang, D.,Dooley, L., Tuovinen, J.E.(2002). Gestalt Theory in Visual Screen Design – A New Look at an Old Subject. Seventh World Conference on Computer in Education, Compenhagen, July 29 – August 3, 2001. Australian Computer Society, Inc.

Carrol, J.M.(2003). HCI Models, Theories and Frameworks – Towards a Multidisciplinary Science (ed.). Morgan Kaufmann Publisher: CA, USA.

Gunter, M.A., Estes, T.H. & Schwab, J.H. (1990). Instruction – A Models Approach. Allyn and Bacon: Massachuset.

Hilbert, D.M & Redmiles,D.F. (2000). Extracting Usability Information from User Interface Events. ACM Computing Surveys. 32(4). Pp 384-421.

Rubin, J. (1994). Handbook of Usability Testing – How to plan, design and conduct effective tests. John Wiley & Sons. Inc.: New York.

Hooper, S.R.,Hannafin, K.M., Kini, A.T., Hannafin, J.M. & Rieber, L.P.(2002). Research on and research with emerging technologies. Handbook of Research for Educational Communication and Technology. The Association for Educational Communications and Technology (AECT):Indiana.

Laila Rahman (2005). MoE, UBD Sign E-Education Deals. Borneo Bulletin, May, 22, 2005. pg 3.

Laila Rahman (2005). More Schools to be equipped with ICT Facilities: Minister. May, 22, 2005. pg 3.

Memorandum by Deputy Director Awg Hj Abdul Salam bin POKPS DP Hj Hashim (November, 3, 2003). Intergration ICT Across School Curriculum for Government Secondary and Primary Schools. Planning, Research and Development Department, Ministry of Education, Brunei Darussalam.

Pallof, R.M. & Pratt, K. (2001). Lesson from the Cyberspace Classroom – The Realities of Online Teaching. Jossey Bass, A Wiley Co.: California, U.S.A.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S. & Carey, T. (1994). Human-Computer Interaction. Addison-Wesley: Essex, England.

Wilding, C. (1998). Practical GUI Screen Design: Making It Usable. CHI '98 ACM Press : New York, U.S.A.

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APPENDIX 1

Table 10: Favorite colors representation

Favorite color			Color representation			Total
			Personal	Culture	Emotion	
Favorite color	Red	N	10	2	0	12
		% within Favorite color	83.3%	16.7%	.0%	100.0%
		% within Color representation	15.9%	40.0%	.0%	14.5%
		% of Total	12.0%	2.4%	.0%	14.5%
	Blue	N	35	1	11	47
		% within Favorite color	74.5%	2.1%	23.4%	100.0%
		% within Color representation	55.6%	20.0%	73.3%	56.6%
		% of Total	42.2%	1.2%	13.3%	56.6%
	Yellow	N	4	0	0	4
		% within Favorite color	100.0%	.0%	.0%	100.0%
		% within Color representation	6.3%	.0%	.0%	4.8%
		% of Total	4.8%	.0%	.0%	4.8%
Green	N	7	2	2	11	
	% within Favorite color	63.6%	18.2%	18.2%	100.0%	
	% within Color representation	11.1%	40.0%	13.3%	13.3%	
	% of Total	8.4%	2.4%	2.4%	13.3%	
White	N	5	0	2	7	
	% within Favorite color	71.4%	.0%	28.6%	100.0%	
	% within Color representation	7.9%	.0%	13.3%	8.4%	
	% of Total	6.0%	.0%	2.4%	8.4%	
Black	N	2	0	0	2	
	% within Favorite color	100.0%	.0%	.0%	100.0%	
	% within Color representation	3.2%	.0%	.0%	2.4%	
	% of Total	2.4%	.0%	.0%	2.4%	
Total	N	63	5	15	83	
	% within Favorite color	75.9%	6.0%	18.1%	100.0%	
	% within Color representation	100.0%	100.0%	100.0%	100.0%	
	% of Total	75.9%	6.0%	18.1%	100.0%	

APPENDIX 2

Table 11. The most dominant color * Related to ethnical culture (figure)

		Related to ethnical culture(figure)					Total	
		*	SD	D	SA	A	SA	
Blue	n		12	17	17	6	1	53
	% within The most dominant color		22.6%	32.1%	32.1%	11.3%	1.9%	100.0%
	% within Related to ethnical culture(figure)		66.7%	54.8%	94.4%	60.0%	20.0%	64.6%
	% of Total		14.6%	20.7%	20.7%	7.3%	1.2%	64.6%
Red	n		1	7	1	2	2	13
	% within The most dominant color		7.7%	53.8%	7.7%	15.4%	15.4%	100.0%
	% within Related to ethnical culture(figure)		5.6%	22.6%	5.6%	20.0%	40.0%	15.9%
	% of Total		1.2%	8.5%	1.2%	2.4%	2.4%	15.9%
Yellow	n		0	2	0	1	0	3
	% within The most dominant color		.0%	66.7%	.0%	33.3%	.0%	100.0%
	% within Related to ethnical culture(figure)		.0%	6.5%	.0%	10.0%	.0%	3.7%
	% of Total		.0%	2.4%	.0%	1.2%	.0%	3.7%
Green	n		2	3	0	1	1	7
	% within The most dominant color		28.6%	42.9%	.0%	14.3%	14.3%	100.0%
	% within Related to ethnical culture(figure)		11.1%	9.7%	.0%	10.0%	20.0%	8.5%
	% of Total		2.4%	3.7%	.0%	1.2%	1.2%	8.5%
Black	n		1	2	0	0	0	3
	% within The most dominant color		33.3%	66.7%	.0%	.0%	.0%	100.0%
	% within Related to ethnical culture(figure)		5.6%	6.5%	.0%	.0%	.0%	3.7%
	% of Total		1.2%	2.4%	.0%	.0%	.0%	3.7%
Brown	n		2	0	0	0	1	3
	% within The most dominant color		66.7%	.0%	.0%	.0%	33.3%	100.0%
	% within Related to ethnical culture(figure)		11.1%	.0%	.0%	.0%	20.0%	3.7%
	% of Total		2.4%	.0%	.0%	.0%	1.2%	3.7%
Total	n		18	31	18	10	5	82
	% within The most dominant color		22.0%	37.8%	22.0%	12.2%	6.1%	100.0%
	% within Related to ethnical culture(figure)		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total		22.0%	37.8%	22.0%	12.2%	6.1%	100.0%

*SD – Strongly Disagree D- Disagree SA- Slightly Agree A- Agree
SA – Strongly Agree

APPENDIX 3

Table 12. The second dominant color * Related to ethnical culture (ground)

		Related to ethnical culture (ground)					Total
		SD	D	SA	A	SA	
Blue	n	4	5	1	1	2	13
	% within The second dominant color	30.8%	38.5%	7.7%	7.7%	15.4%	100.0%
	% within Related to ethnical culture (ground)	23.5%	17.2%	6.3%	6.7%	28.6%	15.5%
	% of Total	4.8%	6.0%	1.2%	1.2%	2.4%	15.5%
Red	n	2	1	1	1	1	6
	% within The second dominant color	33.3%	16.7%	16.7%	16.7%	16.7%	100.0%
	% within Related to ethnical culture (ground)	11.8%	3.4%	6.3%	6.7%	14.3%	7.1%
	% of Total	2.4%	1.2%	1.2%	1.2%	1.2%	7.1%
Yellow	n	3	7	0	2	0	12
	% within The second dominant color	25.0%	58.3%	.0%	16.7%	.0%	100.0%
	% within Related to ethnical culture (ground)	17.6%	24.1%	.0%	13.3%	.0%	14.3%
	% of Total	3.6%	8.3%	.0%	2.4%	.0%	14.3%
Green	n	3	9	4	9	4	29
	% within The second dominant color	10.3%	31.0%	13.8%	31.0%	13.8%	100.0%
	% within Related to ethnical culture (ground)	17.6%	31.0%	25.0%	60.0%	57.1%	34.5%
	% of Total	3.6%	10.7%	4.8%	10.7%	4.8%	34.5%
White	n	2	1	1	0	0	4
	% within The second dominant color	50.0%	25.0%	25.0%	.0%	.0%	100.0%
	% within Related to ethnical culture (ground)	11.8%	3.4%	6.3%	.0%	.0%	4.8%
	% of Total	2.4%	1.2%	1.2%	.0%	.0%	4.8%
Black	N	0	3	4	1	0	8
	% within The second dominant color	.0%	37.5%	50.0%	12.5%	.0%	100.0%
	% within Related to ethnical culture (ground)	.0%	10.3%	25.0%	6.7%	.0%	9.5%
	% of Total	.0%	3.6%	4.8%	1.2%	.0%	9.5%
Black	n	3	3	5	1	0	12
	% within The second dominant color	25.0%	25.0%	41.7%	8.3%	.0%	100.0%
	% within Related to ethnical culture (ground)	17.6%	10.3%	31.3%	6.7%	.0%	14.3%
	% of Total	3.6%	3.6%	6.0%	1.2%	.0%	14.3%
Total	n	17	29	16	15	7	84
	% within The second dominant color	20.2%	34.5%	19.0%	17.9%	8.3%	100.0%

% within Related to ethnical culture (ground)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% of Total	20.2%	34.5%	19.0%	17.9%	8.3%	100.0%
