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Digital Diversions for Educational Recess: An Evaluation of Mood Reinforcements with Interactive Multimedia

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Abstract. A set of short-duration interactive multimedia was designed to assess how their introduction in the middle of long stressful class-hours could trigger positive mood changes in adolescent students, and therefore induce better learning curves. The digital Adobe Shockwave software was used to combine multimedia including video, photography, humorous references, and music to evoke empathetic engagement and create relief from learning overload. Whether such digital interventions could affect mood in a positive manner both during consumption and later phases of learning performances were studied for a group of undergraduate students at the San Diego State University, California and The University of Guanajuato, Mexico (n = 88). Statistical analyses of mood changes indicate a trajectory of positive reinforcement. Younger positively motivated participants prior to the start of the game (age $\leqslant$ 19 years) engage more positively in digital diversions than reluctant and slightly older participants (Pearson *r* 0.311 vs. -0.189). The study indicates the possibility of using digitally created interactive diversions for better cognitive output in unilateral classroom scenarios. The findings underline the basic assumption that digital diversions are integral to contemporary socio-educative environments, are capable of being accommodated in the general educational structure in contemporary times.

Keywords: Brain breaks, interactive multimedia, recess, mood change, reinforcement.

1 Introduction

The rationale for this experiment is based on a three-fold purpose: the first being a need to understand the role of recess or transitory diversions for adolescents in the contemporary educational environment (Toppino 1991; Pellegrini and Smith 1993; Pellegrini 2005). Children, especially teenagers, poised to complete their undergraduate

studies are already having to confront an extraordinarily heavy curriculum and its correlated stressful task requirements.

We examined if a positively motivating recess or break, offered during long and intensive study sessions for a day, could be of benefit for students subjected to unilateral classroom scenarios.

The effects of recess, especially play activity, have been studied although results of such findings have been strongly debated (Jarrett 2002); the issues pertaining to usefulness of recess activities have not been fully resolved either in theory or in practice, especially in countries with advanced curricular programs.

Hence in the second part of our project we developed a unique short-duration interactive multimedia which students could access on their PCs, tabs or other similar platforms. The purpose was to design a humour-integrated deictic multimedia that could affect teenagers' mood states and alleviate pressure deriving from pedagogical strain. With hints taken from studies on digital engagement (Dickey 2005; Dickey 2007) the multimedia also incorporated a click and answer mechanism for recording students' responses, and assessing the trajectory of their mood.

Finally, in the third related and concluding part of the project we ran a statistical data analysis of the responses on a MATLAB program created to evaluate the effects of the multimedia on students. A post engagement semantic factor analysis determines if the hypothesis regarding digitally manipulated recess could reinforce learning behaviour and encourage better post-session performance for the selected teenagers.

2 Literature Review

The primary concern here has been to design an interactive media for recess or intervals during, or in-between, sessions of classroom based learning. In order to do that, we assumed that recess or break is necessary for cognitive reset, and further that such recess periods could be manipulated to induce positive mood states in young and adolescent learners. By definition recess is a time of physical diversion intended to trigger playful creativity, release and mood enhancement (Smith and Boulton 1990; Stevenson and Lee 1990; Pellegrini and Smith 1993). Recess breaks monotony, and provenly reduces stress and cognitive interference (Pellegrini and Bjorklund 1997).

We sought to engage students with play behaviour of an indoor (rather than outdoor) nature, and tried to arouse positive moods with the hope of achieving better task appraisals. In fact, we synchronized recess with mood arousal strategies in a combinatorial experiment uniquely adapted for our investigations. Recess is generally known to have beneficial effects on growth and learning capacities in children (Smith and Boulton 1990; Stevenson and Lee 1990). But studies on recess are mostly concerned with physical exercise and activity; the proven necessity of physical exercises has been integrated in terms of dedicated class hours of physical training or exercise (Bryan and Bryan 1991; Yasutake and Bryan 1995; Dillman et al 2008), sometimes in contra-distinction to recess as a conceptually undefined period of free and uninhibited enjoyment.

The question of recess time physical activity is old as Vygotsky's first analytical description of the role of games in the developmental process (Vygotsky 1967).

Piaget also emphasized on the rough and tumble interactions of recess as necessary aspect of a child's maturity and adjustment, as well as self-esteem (Piaget 1987). Recent studies have focused more on precise mechanics of physical exercise as a means of creative diversion. For example, experiments coding variables of physical activity have demonstrated that children preferred rough and tumble games as an inalienable part of their self-assessment and growth (Alderman, Beighle and Pangazi 2006).

Symbolic play was already being considered by Vygotsky to be an important factor in the growth of the child. Recess appears to provide the space for engagement, physical contact and mimetic conflicts which promote social accommodation and ambitions.

More recently, Pellegrini (2005) and Pellegrini and Bjorklund (1997) drew attention to the more incumbent stress factors that operate in learning scenarios. It is suggested that recurrent signal induction creates an overload for the cognitive system, and that this problem is particularly acute for learning situations in which breaks or diversions are eliminated. Cognitive interference may be considerably reduced by offering recess or time-out sessions; the digital opportunities for diversions has not been explored to the best of our awareness, although it is true that Dickey and his colleagues have roundly studied how things like big data, and socially interactive media might actually enhance various kind of non-curricular skills, especially of empathy (Dickey 2007).

When compared to non-laptop classrooms, students in laptop classrooms reported higher participation rates, more interest in learning, and a greater motivation to perform well (Trimmel and Bachmann 2004). Surveys of current students and alumni frequently show varying but generally positive levels of satisfaction with laptop programs (Finn and Inman, 2004; Mitra and Steffensmeier 2000). Demb, Erickson, and Hawkins-Wilding (2004), in a survey of current students, found that students felt laptops had a positive effect on their study habits and were important to their academic success. Granberg and Witte (2005), in one of the few studies that looked at non-structured classroom use of laptops, even promoted instant messaging as a benefit.

They claimed that this technology allowed students to make comments to or ask questions of fellow students "silently" without disturbing others, though they provided no evidence that this was beneficial to student learning. Two issues stand out in the research on the benefits of laptops. First, much of the research focuses on studying recess is also probably not related to questions of distraction. Even though literature suggests that emotional distractors impair goal-oriented task appraisal (Dolcos and Maccarthy 2006), the same criteria may not be applied to recess. Indeed, research on the presence of detractor type interferences like use of laptops inside classrooms, initiated during the same time demonstrates both positive and adverse results.

But adverse cases where laptop usage is shown to have distracting effects on working memory not all variable included in the class room scenarios have been considered (Fried 2008). Cases where multitasking seems to have been facilitated by laptop use is more supportive of greater accommodative potential – especially in our research. We have chosen a cross–section exposed to overburdened learning, to study how recess or breaks reduce cognitive interference by dissipating focus and feedback related to their tasks. The correlation between feedback and performance may not be a good indicator in all cases but it may be important to test how mood affects or interacts with feedback. (Kluger and DeNisi 1996; Kort et al 2001).

To minimize cognitive overload and to introduce short-term diversions in the form of digital games or interactive media could be thus useful, rather than proving to be a distraction in the learning process.

3 Mood Changer Paradigm

Coupled with the basic ideas on recess or diversion – although the latter term is more clearly confined to non-educational therapeutic or palliative efforts, - is the question of mood. Indeed 'recess' does not stand a chance in education, unless its orientation recognized. Mood states are emotional states and are usually considered more in terms of their valence, that is positive or negative condition but they have to be distinguished from protracted emotions or feelings, and are generally conceived as having more immediate consequential influences on future emotional states (Schinnerer 2004; Christensen and Lyager 2015). In this mood states are distinctive and consequential, "Mood is considered as a group of persisting feelings associated with evaluative and cognitive states which influence all the future evaluations, feelings and actions." (Amado Boccara et al 1992), In fact research shows that mood states are analysable in terms of the behaviors they promote. It is probably more helpful to connect mood states, rather than feelings, with learning abilities.

The precise causal relationship between positive moods and increased learning have been studied for a long time. It is known that positive mood facilitates memory and tasks of discrimination in children. Such experiments have been traditionally conducted by inducing mood states with affective narrative content –and then measuring performances of memory task designed specifically for the purpose (Potts et al., 1986). Related and more relevant measurements have demonstrated better acquistion of mastery in tasks involving discrimination **(**Masters et al. 1979). Aside of educational concerns mood has been seen to promote altruism when induced for experimental cases (Isen & Levine, 1972; Carlson 1988; Bryan 1999; Berto 2005). Brainwave entrainment also shows a correlation between mood and intrinsic motivation (Schlegel et al 2017). Mood states facilitate motivation. Whereas studies on behavioral enhancements induced by positive moods call for introduction of devices or strategies of mood enhancement: these are recorded in the literature.

The fact that mood states have consequential actions lead to productive studies on the effects of a positive mood on learning was studied productively by Bryan and Bryan 1991. Bryan and Bryan (1991), but also Yasutake and Bryan (2005) studied the effects of moods – more precisely, we may say- focussed study of the behavioral differences produced under experimentally simulated conditions, including interventions created with the help of videos, music, verbal illusions and other kinds of strategic settings (Bryan and Bryan 1991; Bryan et al 1996; Yasutake and Bryan changes are correlated to learning behaviors are scace but not unimportant. Infact, the behavioral fcets of positive mood and arousal could be studied for more accurate predictions of learning outcomes. Although in studies of Bryan et al, pellegrini and colleagues have generally concluded how inducing positive moods, even such as involving recess activities can enhance learning task achievements, both in case of impaired children with learning disabilities, as much as in normal students.

What mood induction strategies lack however – in experiments so far – are more explorative possibilities, especially in the context of the more obsessive engagements with media. A brief survey at the tools of experiments on mood and learning indicate that conventional methods of inducement have been used. Consider for example, moods were aroused using self-reports of well-being, odorification, or gifts of money Isen & Levine, 1972; Isen, Horn, & Rosenhan, 1973). We believed that there is ample opportunity to explore digital bases of emotions. In a sense, these are also socioeconomically conditioned possibilities of mood evocation, especially for societies that are more affluent and have access to technology. Our methodology involving mood states were appropriate for the target audiences selected in students cross-sections from both California, and Mexico

4 Digital Affordances

For our project, we have narrowed down and simplified the propositional structure of our experiment by combing both procedural theories into a single account of practical intervention in educational environments. A prescriptive bias underscores the process as we correlate and dissolve the issues of recess and mood arousal for predictable and positive outcomes. The conceptual synthesis may be represented in terms of Gibsonian affordances - as a quest to identify or implement a form of environment (Haynie 2008). Even here though we consider that restorative environments have a directly proportional impetus for heightened attentional capacity (Camargo 2006; Berto et al. 2010).

The question of creating recreational niches is intrinsic to education –but it is somewhat one-sided because of the recurrent emphasis on the need for physical exercise or engagement. The insights into leisure activities (and their relationship with educational tools) naturally leads us to consider the digital environment, and the emerging immersive affordances created by virtual or alternative worlds. The social networking sites are ample proof of how we are increasingly exposed to a digital workplace, or digitally interconnected environment are turning to the resources of the digital world itself, and not outside of it, to include things like social networking sites, or big data entertainment modules in the form of YouTube and other internet blogging activity, for simultaneous bouts of leisure and reinforcement.

We may note that on the one hand there is a distrust of digital platforms and media. Students in the young adolescent category may be prone to a growing and an almost obsessive engagement with social media -involving multimedia, video and video-games, and various kinds of interactive formats (Song et al.2004; Stafford et al. 2004; Yarush 2016).

But keeping that in mind another group of researchers find more evident positive effects of digital media on children, especially in contemporary settings in which they use not just computer, i.e. desktop, or TV and similar stationery portals, but also increasingly, devices like mobile phones, or internet enabled devices like tablets. Indeed, such media are implicating more time as also depth of involvement among all segments of users (Song et al 2004; Gross 2004). Our question is to examine if non-serious viewing and interaction may not be detrimental in all cases (Roaten 2011; Courage et al 2015; Mallon 2015). Advantages of diversions and game induced

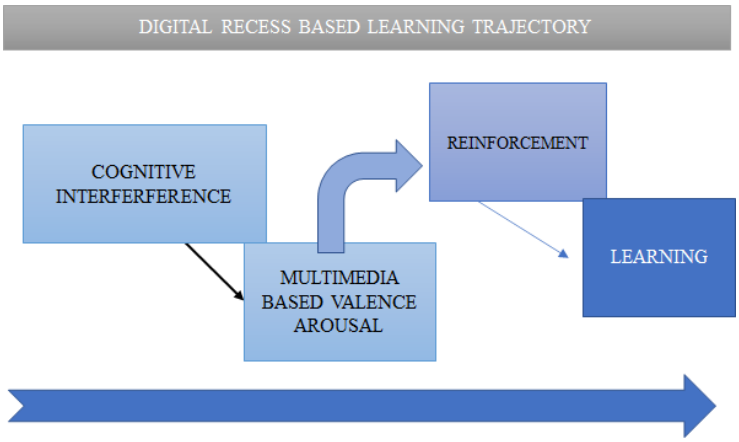

Fig. 1. A map demonstrating possible trajectory of digital interactive media for mood orientation and reinforced learning ability.

attention have also been already acknowledged (Abate and Benghiat 1993; Ophir et al 2009; Bekele 2010).

Such studies, specifically on advantages of interactive media, may have some promise for enhanced perception and learning (Bekele 2010; Courage 2015; Rosen 2011). Indeed, a good of research has already introduced us to the question of how differently abled persons may be empowered to cope with stress and imposing factors of the environment. Not only this, the effects of digital media on veterans and seniors have been closely studied. Digital platforms may provide independence as well as shared opportunities of entertainment and positive attitude building for broader social acceptance. It is a new area and has much potential for application, especially where digital media and various multi-method strategies could be used to alleviate depression and isolation of seniors, veterans, retired and challenged personnel (Wiemeyer and Kliem 2011; Anguera 2013).

For this purpose, we developed an interactive multimedia of very short duration to check if digitally open recess and diversions – if they are wisely incorporated within learning schedules, may actually help the learner to refresh and re-invigorate the passion for further learning.

The primary objective is hence to investigate if such diversions could be used for reinforcement of learning behaviors in adolescents who study within normal unilateral educational contexts of school and college.

4.1 Building the Media

Though there is a general agreement on the definition of narrative in interactive games, this project tends to follow a more open-ended interactive format which involves less decision making. Games have been traditionally considered as decision making modules of engagement. The authors here proposed an affect indecision for the interactive program. This keeps the possibilities open (Whitney-Vernon 2004). More significantly, the games are meant to register a score of liking, rather than competence

measures so common to other platforms (Deen 2015; Salen and Zimmerman 2005). Sladkey takes a very decisive experiment on engendering positive effects to its next level.

In his remarkable prescriptive quasi-games in his brain energizing manual Sladkey involves all different techniques of recess, physical ardour and sensuous interactions with arts and color objects to reinforce learning attitudes in young children "a quick physical and mental challenge that's like hitting the refresh button on your computer, but for your students" (Sladkey 2009; Stone 2015). The rationale for such brain breaks is most appropriate for development of a digital interactive media of the kind achieved for this project (Stone 2015). In brief, digital media offers more attractive, and more engaging features for the contemporary generation and every advantage of this fact has been taken. Not only this, it was thought meaningful to include a human and empathetic component in the design of the human which is much unlike what standard Mario prototypes could offer. The situations depicted are not stereotypes of programming language but human, video inputs and narratives that evoke emotive, mood changing responses. Hence the interaction between age, gender, and above all prior mood states are important for assessing how such games generate a trajectory of responsiveness for young learners.

5 Experiment

For this experiment, an online link was forwarded to select students (n= 86) at the San Diego State University and of students in the undergraduate program of Digital Arts at the Universidad de Guanajuato, Mexico. To all intent and purposes the basic objective was to allow these students to access the interactive media in the given link and to play the game for a certain period of time. One of the preconditions defined was to acknowledge if the participants had been subjected to a long duration of class or workshop for the day and were then allotted a free period to engage in the multimedia. The students may have felt necessary to take a break from the extent of learning hours administered for the day.

5.1 Methodology

Participants who engaged with the interactive media had to first answer a PANAS-POMS type questionnaire for mood assessment (Watson et al 1988). This test was not offered in a formal pen and pencil format but integrated into the media kit as a set of three questions. Responses had to be provided by clicking on emoticons to which specific numerical values were attached. The emoticons were included in a defined metrics, similar to the Likert scale prototype of -1 to +1, and translated into a 100 points incremental scale. Students had to respond to an emoticon corresponding to a three-dimensional structure of the emotion-valence scale (Barrett 1998). Hence by clicking on the emoticon participants were not merely indication if at that moment they were either happy or sad, but also what amount of arousal or excitement they experienced (Lane 1990; Jang 2015). In fact, the same mechanism of emoticons was deployed for the click-type interactive media, namely the five games. Not all participants were asked to play all games. They had a degree of choice and freedom not only to break the spell

of learning for the period but also to choose a game that suited their temperament and to play with its specific narrative.

5.2 Project Concepts and Techniques (Games 1 – 5)

The authoring intent in all five multimedia projects described in this article was to create short entertaining game-like experiences that could be experienced in a gallery installation or viewed in a browser on the internet. Adobe Director was the primary authoring tool because it provides tools for importing images, video, and audio. It has a user-friendly programming language called "LINGO" for assembling and authoring the content.

After the projects were completed, they were published from Adobe Director as DCR Shockwave files which could then be imported into HTML web pages. The programing facilitates visual and audio events such as random or sequential changes of images, video and audio; conditional events that occur if and when other occurrences are true; timing changes; mouse clicks; keyboard clicks; etc. Images were processed using Adobe Photoshop. In most cases, images were cropped masked and the color and tones ware manipulated and enhanced. In some cases, variations were produced to create animations. Videos were edited and composited in Adobe After Effects and Adobe Premiere. Audio was edited, mixed and manipulated using Audacity. Of the total of five different interactive medias developed all are comic recreational game-like reactions to life changing and life influencing occurrences.

5.3 Recess Interface Game 1

Walking in the Woods

Walking in the Woods presents a humorous metaphoric walk through life using self-portraits. The user clicks on my face and the perceived walking changes direction. Versions of a face change as clean-shaven or bearded. Changing directions symbolizes struggles with decision making in life choices and changing versions of the face itself as clean-shaven or bearded relates to the protagonists struggles with a self-image. The audio helps create a playful and comic atmosphere.

The sudden and abrupt change in direction of walk and the appearance of the face is brought by the click of the mouse. The click creates an unexpected reversal, with a resulting incongruously nervous release, thus eliciting laughter. Participants especially adolescents were visibly moved to laugh and toy out with the traveler's destiny in the game.

5.4 Recess Interface Game 2

Hit Me invited a reaction to how the traveler felt at the way the world was treating him. While the multimedia piece is idle, the user finds the image of the protagonist repeating random phrases such as "I just want to be happy in life". When the user clicks the "Z" and "X" keys, boxing gloves appear on either side of a face and strike the side of the character's head. The user is enabled to keep striking him with rapid motion. It is quite entertaining to watch him get beaten up, especially by kids-gloves.

Fig. 2. [a] *Walking in the Woods*. Game involving ability to change direction and spin the character's lifestyle [b] *Hit Me*. Game with fun evocation for pseudo-sadistic strikes [c]*Anti-War* is a game on gently mocking celebrities you dislike [d] *Dancing in the Kitchen* simulates efforts to break one's heart with love [e] *Selfies* elicits fun from a rapidly changing facial expressions against unpredictable and humorous backdrops.

5.5 Recess Interface Game 3

Anti-War was a reaction to the war. It contains a multiplicity of cartoon characters and childrens' music. The animated playful carnival was made up of a similar click-type shooting gallery in which adolescents could 'shoot' a figure of their liking or choice in order to transform the face into a funny cartoon character. The music is a song by the children and adds to the fun atmosphere. Occasionally, at random time intervals, a hummer drives by that can be shot at with a resulting explosion sound.

5.6 Recess Interface Game 4

Dancing in My Kitchen simulates a love and heartbreak game in which a person presumably tries to clinch love by throwing a dart at the character's heart. The piece also celebrates the freedom of the protagonist by showing him as, dancing in my kitchen. The playful interactivity occurs when the user moves a cross-hair around the screen attempting to line it up with the funny man's heart and then shoot the dart by pressing the "Z" or "X" keys) to hit the heart (break my heart). The protagonist then ducks while dancing and then return to the dance. As hard as the user tries, the user always misses.

5.7 Recess Interface Game 5

The photographs for *Selfies* were taken over one year period of everyday activities. There are over 800 self-portrait photographs in this project. The photographs of the character are set in the exact same location in each frame so that all photographs would align themselves with each other when animated. In this fun animated animation, the self-portraits change so fast that it is difficult to identify the background imagery. On the mouse-click, the image stops so that the composition of the self-portrait against a background can be seen. This way ever click sets up a colorful or scenic backdrop and a correspondingly emoting face.

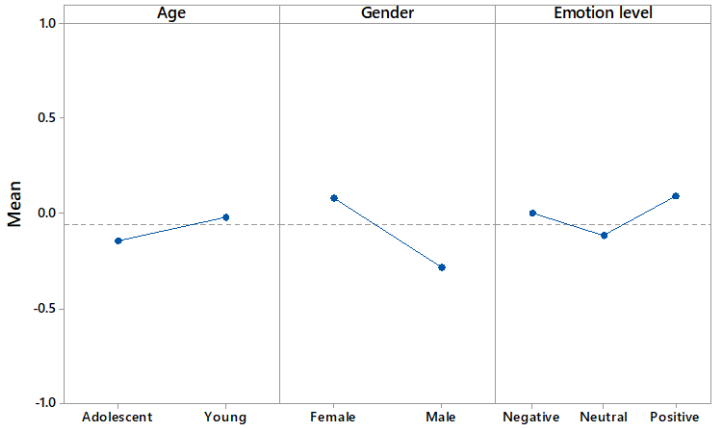

Fig. 3. Plot of main (age, gender and prior emotion level) effects on mood changer (the emotional level after all game).

5.8 The Survey Form and integration of multimedia projects

As previously stated, the multimedia projects were published from Adobe Director as DCR Shockwave files. The Shockwave files were then integrated into HTML pages by importing them into Adobe Dreamweaver. Along with the multimedia project, a caption and button to close the window (and return to the survey) was inserted into the page. The Survey Form was created using the "Forms" Feature in Google Docs. The Pre-Game questionnaire was assembled using the questions and emoticons. Each of the questions in the Interactive Media Questionnaire start with a link to the HTML page that has the respective multimedia project/game. After playing the game, the user closes the page with the game and returns to the Questionnaire.

6 Results

The three major observations for the interactive process have to be based on (a) age (b) gender (c) the emotive-valence score of participants prior to engagement with multimedia. Fig. 3 and Fig. 4 shows the main and pairwise interaction effects on the mood of the media on these participants. Of all three, perhaps the first, i.e. 'age' constitutes a specific target audience for the enquiry on what kind of difference in mood states are evoked. Consequently, the post-game trajectory of the experiment describes the difference that conditions and either motivates or demotivates participants during the recess. The 'submit' comment score comprises a semantic factor response. We translate this on the emotive-valence engagement score for assessing motivation levels after interaction and before the return to study-related tasks.

As Fig. 3 illustrates age has been divided into two levels of observation, (i) adolescent (age ≤19) and (ii) young (age >19) since the age of the participants vary between 13 and 25 years. Gender has been normatively considered on two levels,

Table 1. Chi-square test of independence for different factors (age, gender and emotion level prior to the game) on the emotion level after the game.

Factors	*dF*	Pearson χ^2 Square	*p*-values	Likelihood ratio χ^2 Square	*p*-values
Age	2	2.005	0.367	1.979	0.372
Gender	2	5.748	0.056	5.757	0.056
Emotion level prior to the game	2	4.104	0.392	4.452	0.348

Table 2. Chi-square test of independence for different factors (age, gender and emotion level prior to the game) on mood change (change of emotion level after the game).

Factors or Treatment		**Pearson r**	**Spearman ρ**	**Pearson Chi-Square**	**p-values**	**Likelihood ratio Chi-Square**	**p-values**
Age	Adolescent	-0.037	-0.079	10.07		12.134	
	Young	0.04	0.040	4.993	0.288	6.432	0.169
Gender	Male	0.159	0.129	4.645		3.860	
	Female	-0.079	-0.082	7.654	0.105	9.994	.041

'male' and 'female'. Finally, emotional level prior to game has been divided into three levels, (i) negative, (ii) neutral and (iii) positive as demonstrated in Fig. 1.

Sum of the scores are calculated from clicks on "I like", reverse of "I don't like" and "emoticon that describes me best" (since the last ranged from positive to negative on the visual scale). Score extractions corresponding to $\leq 5, 7, \geq 8$ have been considered as 'negative', 'neutral' and 'positive' respectively on the emotive- valence scale.

Fig. 3. shows that there is no significant difference in mean values of the mood change (emotion level after the game) for different level of age and emotion level, however substantial difference in mood change is noticed for two different levels of gender. We conduct the chi-square (χ^2) test of independence to test for a statistically significant relationship between factors (age, gender and emotion level prior to the game) and the response (emotion level after the game) and. We adopt the null hypothesis:

- H_0: There is no relationship between the factors and the response, i.e., they are independent.

Our alternate hypothesis is:

- H_a: There is a relationship between the response and factors and the responses, i.e. they are dependent.
- If $p \leq \alpha$ we reject the null hypothesis. If $p > \alpha$ we fail to reject the null hypothesis. We choose the value of Cronbach's α as 0.05.

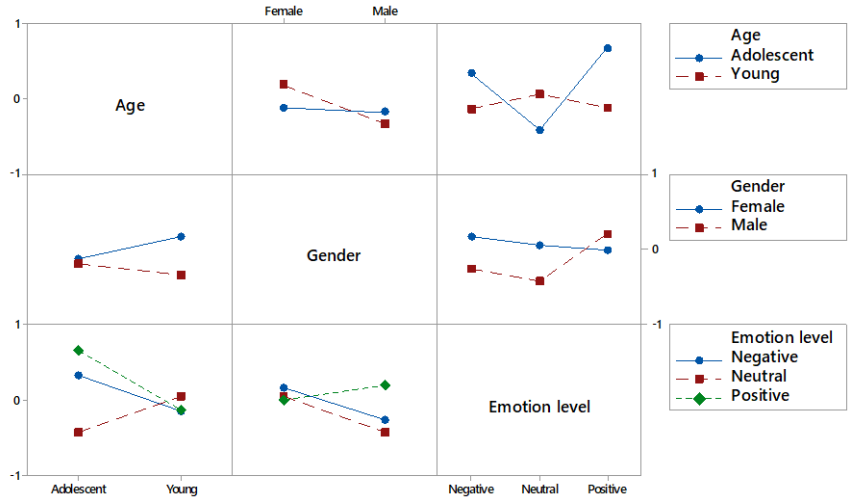

Fig. 5. Interaction plot of the effects of age, gender and prior emotion level on the emotional level after all game.

The *p*-values associated with these factors are shown in Table 1. Table 1 illustrates that the factor variable of gender is more significant than age and emotion levels prior to the game or interaction, because both of their *p*-values are much larger than that of age. However, the *p*-value for gender (0.056) is equal to the Cronbach's α level of 0.05, which indicates that it might be statistically significant and act as a mood changer.

To further identify the factors responsible for mood change through the entire application (difference between the emotion levels before and after the game), we conduct the chi-square (χ^2) test of independence for age and gender independently on two different levels, results for which are illustrated in Table 2. Results show that age and gender independently cannot account for any significant change of mood (since combined factorial *p-values* are greater than 0.05). This could imply that there is no sufficient evidence to believe that age or gender are natural determinants for the outcomes of the interactive recess. We would have to investigate if other psychological elements are also proactive in either predicting or understanding how they might affect the learners chosen for the experiment.

Fig. 5 demonstrates the interaction plot of the factors. An interaction plot is a plot of means for each level of a factor with the level of a second factor held constant. Interaction plots are useful for judging the presence of interaction. We conduct chi-square test of independence for interaction effect of age with gender, prior emotion level and combined effects of gender and prior emotion level with age on mood change registered after the game: the interaction effects are demonstrated in Table 3.

Similarly, Table 4 illustrates chi-square test of independence for interaction effect of gender with age, prior emotion level, and combined effects of age and prior emotion level with gender on mood change (change of emotion level after the game). Table 5 demonstrates chi-square test of independence for interaction effect of prior emotion

level with age, gender, and combined effects of age and gender with prior emotion level on mood change (change of emotion level after the game) due to digital diversion.

7 Conclusions

What is most import in designing such educational diversions is the necessity of incorporating an empathetic factor for the media. This is possible for designers who value long term acculturation and understanding of adolescent psychology and expectations of children at the very crucial and formative phase of their maturation. The game designs have a kind of reflexive and comedic value which appeals directly to the adolescent observer. Simple observation demonstrated that for most of the participants both in two different locations and countries, with similar social environments and values, would laugh and appreciate the comic gesticulations of the videos.

Thus, empathy and fun are ruled in for the games in a way an audio-visual prototype dependent on a programming sequence might never be able to achieve. Further This also goes ahead to show that games are not decision-making tools for cognition just as most gaming designers tendto show. It depends in fact on the nature of the game which may or may not involve cognitive decision making – although on some level decision tasks would have to be involved. But unlike what Sid Meir or Salen and Zimmerman showed in games they designed, mood enhancer games may have more of an emotive content. Games, as mood changers need to deal with affect and emotional arousal in a much more concerted manner rather than leaving the outcome solely on decisions. This suggests that game strategies are not exhausted in practice, nor is there much reference to this aspect in contemporary game design.

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