"The Effects of Instructional Media on Learning Outcomes in Graduate Nursing and Physical Therapy Students at Angelo State University"

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Final Research Project
Submitted in partial fulfillment of the
Requirements of the course: PT 7344
Physical Therapy Program
Angelo State University
May 8, 2015

Abstract

Instructional media is the use of aids by an instructor to supplement student learning. Such aids have improved over the years in congruence with advances in technology. In this study, graduate physical therapy students (DPT) and graduate nursing students (GN) enrolled at Angelo State University were divided into two groups to examine the effects of supplemental instructional media on their learning experience. One group received instructional media resources in addition to PowerPoint lectures, while the control group received only the PowerPoint lectures. The intent was to determine if these additional resources contributed to improvements in the students' grades as well as their level of engagement during a DPT and GN course. Students were separated into two GPA-matched groups with researchers blinded to participants' group assignment. Learning outcomes were 3 quizzes, a written assignment, a test, and a survey regarding the instructional media interactions (administered to only the intervention group). Increased age of participants was negatively correlated with lack of engagement in the instructional media while all other outcomes were not found to be statistically significant. At this point, supplemental instructional media may not be necessary for students at the graduate level of healthcare education. However, as exposure to technology occurs at an earlier age, it may be necessary for teaching styles to adapt to accommodate technology influenced learning styles. Further studies should be conducted to determine if such adjustments will be necessary.

Key Words: Instructional media, physical therapy, graduate nursing, interprofessional education

Background

Students currently entering professional healthcare and related graduate programs are more likely to have grown up with, and be familiar with, technology and gaming products compared to their predecessors.[1-3] Older students enrolled in graduate programs are likely members of Generation X (Gen Xers), were born between 1960 and 1980, while the majority of students currently enrolled in programs are likely Millennials, born between 1981 and 2000.[4] While Millennials may have grown up with near continuous exposure to technology, Gen Xers are also very comfortable with technology, having seen devices such as personal computers, cell phones, pagers and gaming systems all emerge while they were still young.[5-6] Over the next few years, a new generation will begin to enter college, and soon thereafter, graduate programs. Born after 2000, the so called "Facebook Generation" will not only represent a group of students with technology ingrained in their lives, but one that has known near constant connectivity through cell phones and the internet.[4] This shift in students' familiarity with technology represents an opportunity for educational programs to appeal to applicants in new ways, if they are able to successfully integrate traditional teaching methods with newer technology. While academic performance is the ultimate goal of classroom based instruction, graduate programs seeking to differentiate themselves are likely to be interested in enhancing students' satisfaction with the learning process as well. There are typically two aspects of the learning experience that are addressed when examining gaming-augmented learning, namely, student satisfaction with the learning process, and the impact on academic performance.[7] The role of interactive computer-gaming software in supplementing traditional instructional methods has been explored in a number of environments over the past decade in an effort to improve both

performance and student satisfaction.[1,7-9] Information from the 2004 Games for Health Conference suggested that higher learner enthusiasm could in fact increase overall academic performance by making the time students spend on learning material more efficient.[1] Supplementing traditional instructional methods with gaming technology provides an alternative method of delivery of material, which may have positive benefits towards student learning experiences and attitudes. Further research suggests that the successful implementation of technology-based learning depends not only on what the educational institution is able to provide, but also on the efforts put forth by the students.[10] Therefore, while the institution may provide resources of interest to the students, it is ultimately the responsibility of the individual student to take advantage of such resources.

While extensive research exists on the use of technology in education, there still exists a need for more depth and detail. In a recent review of the use of gaming technology in higher education, the Cochrane Collaboration concluded that there was a need for high-quality research, which controlled for as many confounding variables as possible.[8] Although many existing studies have found increases in learner satisfaction, along with retention of the material, their design was often such that no control group was established for comparison.[11-13] In a systematic review, Blakely et al[7] found that there is no consensus in the existing literature regarding the effectiveness of gaming as an instructional supplement. This work further emphasized the need for strict methodology in future research, pointing to the lack of data including confidence intervals, effect sizes and baseline comparability of groups. However, it was concluded that the learning experience could be more enjoyable and academic performance would improve in those students who used educational technology to supplement their learning experience.

A 2010 survey of medical students regarding attitudes towards video games found that a majority of those surveyed were in favor of using technology to enhance their educational experience, with an increased desire to have more educational media in healthcare education.[14] However, as of this writing, no research has been conducted regarding the use of instructional media for both Doctor of Physical Therapy (DPT) and Graduate Nursing (GN) students. Given the positive response to technology in other educational settings, and the lack of data on this specific population, the goal of this study was to examine the impact of the use of instructional media on learning outcomes as well as student attitudes towards learning in a DPT and GN students.

METHODS

Participants

Participants in the study were selected from the DPT and GN programs at Angelo State University during the 2013-2014 academic year. The DPT students participated as part of a face-to-face course, and the GN students participated as part of an online, distance-learning course. Institutional Review Board approval was obtained from the University, and students wishing to participate provided written consent. Participants from each program were divided into two groups, using GPA-matched grouping. Research assistants who created the gaming modules and performed all data analysis were blinded to the student group assignments. The treatment groups included twelve DPT students who had instructional media included as part of their Foundation for Systems Review (PT 7232) course and five GN students who had instructional media included as part of their Advanced Health Assessment (NUR 6331) course. The control groups included thirteen

DPT students and six GN students, who received only the traditional instructional materials, consisting of primarily PowerPoint presentations, and in the case of the DPT students, face-to-face lectures.

The instructional media modules were included in chapters covering three topics: Interprofessional Education (IPE), pain, and interviewing techniques. Three interactive games were inserted into the PowerPoint presentations for each topic. Students in the treatment groups were instructed to complete the games provided, and to use the games to assist them in studying for quizzes and tests. Content for the IPE module was derived from materials published by the WHO National Academy of Science.[15] The content for the pain and interviewing techniques modules was adapted from *Differential Diagnosis in Physical Therapy, 4th ed* (Goodman and Snyder, 2007). [16]

Software

Gaming modules were created using Raptivity® software package (Harbinger Knowledge Products, Pune, India; Redmond, WA). The license purchased for this research included templates from which games could be created. Funding for the purchase of the software license was obtained through a 2013 grant issued by the Office of Special Projects at Angelo State University, San Angelo, Texas. Games were created with the objective of reinforcing content already present in PowerPoint presentations, required textbooks, and lecture.

Games presented to the treatment group included a word search, matching games, a fill-in-the-blank activity, multiple-choice interactions, a Venn diagram, and an interactive mining game. *Find the Words* was used to reinforce words and acronyms commonly used in the discussion of interprofessional education. Participants were given a word bank, and were challenged to find the words listed in a jumbled letter grid. Words could be forward,

backward, sideways, or diagonally placed in the grid. The *Matching* games included a list of words or phrases, with instructions given to subjects to match those with the correct definition from another list. In the *Multiple-choice* interactions, participants were offered a series of questions, each with four possible answers, with instructions to choose the best answer to each question. The *Venn Diagram* consisted of placing words from a word bank into their appropriate circle. Words were either associated with the role of the "Nurse Practitioner", "Physical Therapist", or both. This activity was used in an effort to assist students in learning the various roles of the different health care professionals and was inserted into the IPE learning content. *Mine the Gold* presented the participants with a game with a countdown timer where they could select gold nuggets and diamonds arrayed across the screen. Upon striking the target, participants were prompted with questions, which they had to answer correctly in order to be awarded points. The point value of each gold nugget or diamond was based on its size, with larger nuggets being worth more points. Scores on the activities were not a part of the participants' grades, but it was hypothesized that these supplemental learning activities would benefit the users and allow for a more enjoyable learning experience. **Appendix 1** contains images of the games as presented to the participants in the DPT intervention group.

For the purposes of this study, a hyperlink to each game appeared on a PowerPoint slide sequentially following the material that it was intended to reinforce. Participants in the treatment group were instructed not to share the PowerPoint files with members of the control group. PowerPoint presentations given to the control group were identical to those of the treatment group, except that they did not contain the hyperlink slides.

Post-module survey

All participants in the treatment groups were given a survey after all of the modules containing instructional media, and associated tests and quizzes related to the content were completed. **Appendix 2** contains a copy of the survey, arranged in the same sequence in which it was administered. Groups of items on the survey were intended to determine participants' attitudes regarding either their overall satisfaction with the instructional media, their attitudes towards the usefulness of the instructional media, or whether the instructional media increased their level of engagement in the material. For comparison purposes, items on the survey were categorized using the terms: *satisfaction*, *usefulness*, or *engaging*.

Learning outcomes for DPT

Quizzes were administered to both the treatment and control groups following the IPE module, chapters 1-2 in Goodman and Snyder covering interviewing techniques, and chapters 3-5 in Goodman and Snyder covering pain. DPT participants also completed a written assignment in which they were required to collaborate with a student from the graduate nursing groups. This assignment was intended to reinforce the concepts covered in the IPE module, and grades on this assignment were included in the learning outcomes. Finally, an exam covering information from the first three modules, along with other information covered in the first portion of their courses was included in the learning outcomes for the DPT group. The quizzes for the first two lectures were completed one week after the lecture had been presented. Students were instructed to work individually, but could use their course textbook and individual notes to complete the quizzes in the

allotted time. The third quiz was completed prior to the delivery of the oral lecture, and students were allowed to use their textbook and any individual notes they had. The exam was given sixteen days following the third quiz and no notes or books were allowed.

Learning outcomes for GN

GN students were assessed in a similar fashion to the DPT students. Following the IPE module, a quiz was taken and scored. This same pattern followed for the interviewing and pain modules in the nursing course. Additionally, nursing students completed an IPE assignment that was scored and reported as part of the students' grades. The same testing parameters used for the DPT students held true for the GN students: individuals worked alone, with textbooks and study notes allowed as reference during the quizzes.

Data collection

Data was collected from all study participants regarding their age, gender, and undergraduate GPA, and scores from the three quizzes, one written assignment and one exam (Table 1). Results from the survey were collected from 12 of the 13 DPT students in the treatment group, and all five of the nursing students in the treatment group. One DPT student withdrew from the class during the middle of the semester.

Results

Data analysis was performed using SPSS® version 22.0 (IBM Corporation, 2013). When examining the ages and prior GPAs of the DPT and GN groups, neither group met the tests for normality or equal variances required to use parametric tests to analyze data. Therefore, a Mann-Whitney U test was performed to analyze the between group variances in learning outcomes. A Significance Level of 0.05 was used for all statistical comparisons.

Learning outcomes

Comparing the results of the IPE Quiz of both DPT and GN participants combined (Table 2), there was no statistical difference in the quiz score between the intervention and control groups (U=150, p=0.719). Examining the DPT participants separately, no significant difference was found between the intervention and control groups for scores on any of the DPT learning measures (DPT Learning Outcomes, Table 3). Examination of the GN learning outcomes found no significant difference between the intervention and control groups for scores on any of the nursing learning measures (GN Learning Outcomes, Table 4).

Learning attitudes

The results of the student experience surveys were analyzed to identify whether there were any correlations between the attitudes toward the gaming technology and learning outcomes, age or undergraduate GPA. Tables 5 and 6 (DPT and GN Raptivity correlations) contain Pearson correlation values and p-values for the two groups. Only one correlation for the DPT group was significant: the age of respondents was negatively correlated with the "Engaged" components of the Raptivity® survey (Pearson r = -0.593, p=0.042). None of the correlations between the GN Raptivity® survey results and learning outcomes, age or GPA were statistically significant.

Gender comparison

The Mann-Whitney U test was used to analyze whether the perceptions of the Raptivity® software, as determined by the surveys completed by participants in the treatment groups, differed between males and females. For the DPT and GN groups combined, there were no significant differences between males and females in any of the three Raptivity categories

(Table 7). Examining the DPT and nursing groups separately also found no statistical differences between males and females on the attitudes towards gaming technology in this study (Tables 8 and 9).

Discussion

The results of this research add weight to previous research indicating that interactive technologies used to augment traditional instruction are not likely to improve the overall academic performance or retention in graduate healthcare students. No significant differences existed between the treatment and control groups, for either the DPT or nursing students, on any of the learning outcome measures. This suggests that graduate healthcare programs investing resources in alternative teaching methods may need to reconsider these allocations, as these technologies may be of little value to students at this level. Longitudinal research on long-term use of technology compared to traditional methods remains difficult and unlikely, given the need for public systems to meet state and national requirements year after year. Furthermore, controlling the continuous in- and out-flow of students in elementary classrooms is impossible, leading to a constantly changing subject pool. While technology, and educational games may be becoming more prominent in younger classrooms, carry-over of those teaching techniques to graduate level programs seems unlikely in the current educational environment. However, that change may yet come, as generations born in the 21st century begin to reach post-secondary and graduate level academic institutions.

The findings of this research differ from many other previous studies in that the attitudes towards the instructional media were broadly indifferent, and in some cases

unfavorable. It is also of note that no differences were found in perceptions of an online-only student group compared to a student group in a face-to-face classroom setting. While this factor was not addressed in the current study, it may have influenced the results. Social factors associated with classroom interactions will logically contribute to learner satisfaction when in that setting, but further research is needed to understand if gaming technology is able to supplement those factors for students participating in distance learning courses and programs.

Instructional media is the use of any aids by the teacher to aid in the learning process of the students.[17] Types of instructional media have been evolving over the years; from chalkboards and chalk to whiteboards and dry-erase markers, to Smartboards with touch screen capabilities. Raptivity® is another form of instructional media that shows the further evolution of instructional media expanding to settings outside of the classroom. In addition to instructional media, there are also educational technology resources available. These can be considered more "hands-on" resources such as mannequins or computer generated hospital scenario based games.[18] Our study looks purely at the use of instructional media, but recognizes the usefulness of other educational technology resources. While many studies, including this one, point towards gaming technology having little impact on academic performance in graduate education,[1-3] advances in virtual reality technology may create simulators for entire scenarios in which healthcare students can participate. As these technologies evolve, additional research will be needed to determine if they are in fact successful in improving student performance.

Limitations

While the Raptivity® software website advertises the product as easy to use, creating modules outside of the templates offered was quite restricted and cumbersome. The premade games were easy to use, but adjusting these games' format and content proved challenging. Due to the limitations in the flexibility of the Raptivity® software package, similar game formats were used for several of the modules presented to the participants.

This study involved only Graduate Nursing and Doctor of Physical Therapy students, professions that are generally more hands-on in nature. Therefore, there could be a disconnect between the learning and application of the material, despite the use of gaming, as the games did not closely simulate what the students will be doing in clinical practice. The games used were created under the limitations of the Raptivity® software and were designed specifically to assist the students in preparing for and understanding the material covered in the lectures and textbook. Simulation of actual patient scenarios and real-time interaction may be more beneficial in such advanced clinical programs, especially considering the hands-on nature of these professions.

It must also be noted that nursing and physical therapy are differing professions and as such, the graduate curriculums are not the same. This may have also influenced the results of this study.

Conclusion

While there may be a place for educational technology in the classroom at some point in the future, the current interest in such activities is low and does not add to nor take away from the educational experience of students at the graduate level. Advances in technology are continually being made and children are being exposed to such advances at

increasingly earlier ages. It may be necessary in the future for such educational technology to be more widely used, but future research will need to be done to determine this.

Table 1 – Group Demographics

	Physical Therapy		Nursing		
	Control	Treatment	Control	Treatment	Total
Totals	13	12	6	5	36
Male	5	4	2	1	12
Female	8	8	4	4	24
GPA (mean +/- SD)	3.54 (+/- 0.24)	3.24 (+/- 0.19)	3.61 (+/- 0.25)	3.67 (+/- 0.31)	3.47 (+/- 0.28)
Age (mean +/- SD)	25.38 (+/- 2.93)	26 (+/- 3.24)	38 (+/- 6.72)	41 (+/- 10.3)	29 (+/- 8.50)

Table 2 – PT and nursing, comparison of IPE Quiz scores

	Treatment* (n=18)	Control* (n=18)	p-value**
IPE Quiz	0.73	0.76	0.719
* Mean values of percentage scores			
** Mann-Whitney U			

Table 3 – DPT Learning Outcomes

	Treatment* (n=12)	Control* (n=13)	Total* (n=25)	p-value**
IPE Quiz	90.63	95.19	94.68	0.979
Ch 1-2 Quiz	95.00	91.25	93.20	0.320
Ch 3-5 Quiz	91.54	93.33	92.40	0.437
Assignment 1	98.85	98.08	98.48	0.611
Exam 1	91.54	92.08	91.76	0.936
* Mean values of percentage scores				
** Mann-Whitney U, treatment vs. control				

Table 4 – GN Learning Outcomes

	Treatment* (n=5)	Control* (n=6)	Total* (n=11)	p-value**
IPE Quiz	84.00	76.66	79.91	0.537
Assignment 1	98.00	95.00	96.36	0.329
Assignment 2	100.00	95.00	97.27	0.429
* Mean values of percentage scores				
** Mann-Whitney U, treatment vs. control				

Table 5 – DPT Raptivity questionnaire correlations

(n = 12)	Satisfied	Useful	Engaged
IPE Quiz	-0.224 (p = 0.484)	-0.229 (p = 0.475)	-0.144 (p = 0.656)
Ch 1-2 Quiz	0.134 (p = 0.677)	0.281 (p = 0.377)	0.159 (p = 0.623)
Ch 3-5 Quiz	0.292 (p = 0.357)	0.083 (p = 0.799)	0.349 (p = 0.266)
Assignment 1	-0.180 (p = 0.576)	-0.170 (p = 0.596)	-0.150 (p = 0.641)
Exam 1	-.0282 (p = 0.375)	-0.402 (p = 0.195)	-0.302 (p = 0.340)
Age	-0.398 (p = 0.200)	-0.448 (p = 0.144)	**-0.593 (p = 0.042)**
GPA	0.019 (p = 0.953)	0.127 (p = 0.694)	0.090 (p = 0.780)
Pearson correlation (2-tailed Sig.)			

Table 6 – GN Raptivity questionnaire correlations

(n = 5)	Satisfied	Useful	Engaged
IPE Quiz	0.464 (p = 0.431)	-0.117 (p = 0.851)	0.167 (p = 0.789)
Assignment 1	0.000 (p = 1.000)	-0.520 (p = 0.369)	-0.219 (p = 0.724)
Assignment 2	No variance between assignment scores		
Age	0.566 (p = 0.320)	0.512 (p = 0.378)	0.226 (p = 0.715)
GPA	0.787 (p = 0.114)	0.396 (p = 0.509)	0.520 (p = 0.370)
Pearson correlation (2-tailed Sig.)			

Table 7 – DPT and GN, comparison of perceptions of gaming between genders

	Male (n=5)	Female (n=12)	Total (n=17)	p-value**
Satisfied	4.00 (+/- 0.79)	3.46 (+/- 1.41)	3.62 (+/- 1.25)	0.234
Useful	3.50 (+/- 0.54)	3.10 (+/- 0.91)	3.22 (+/- 0.83)	0.799
Engaged	3.72 (+/- 0.72)	3.07 (+/- 1.04)	3.26 (+/- 0.98)	0.879
** Mann-Whitney U				

Table 8 – DPT, comparison of perceptions of gaming between genders

	Male (n=4)	Female (n=8)	Total (n=12)	p-value**
Satisfied	3.75 (+/- 1.85)	3.31 (+/- 1.25)	3.45 (+/- 1.41)	0.368
Useful	3.16 (+/- 0.91)	3.08 (+/- 0.98)	3.10 (+/- 0.91)	0.933
Engaged	2.95 (+/- 1.06)	3.13 (+/- 1.09)	3.07 (+/- 1.03)	0.808
** Mann-Whitney U, male vs. female				

Table 9 – Nursing, comparison of perceptions of gaming between genders

	Male (n=1)	Female (n=4)	Total (n=5)	p-value**
Satisfied	4.5 (+/- 0.71)	3.88 (+/- 0.83)	4.0 (+/- 0.79)	0.8
Useful	3.63 (+/- 1.19)	3.47 (+/- 1.14)	3.5 (+/- 0.54)	1.000

Engaged	3.60 (+/- 0.89)	3.75 (+/- 0.91)	3.72 (+/- 0.72)	1.000
** Mann-Whitney U, male vs. female				

Appendix 1- Raptivity Module Images

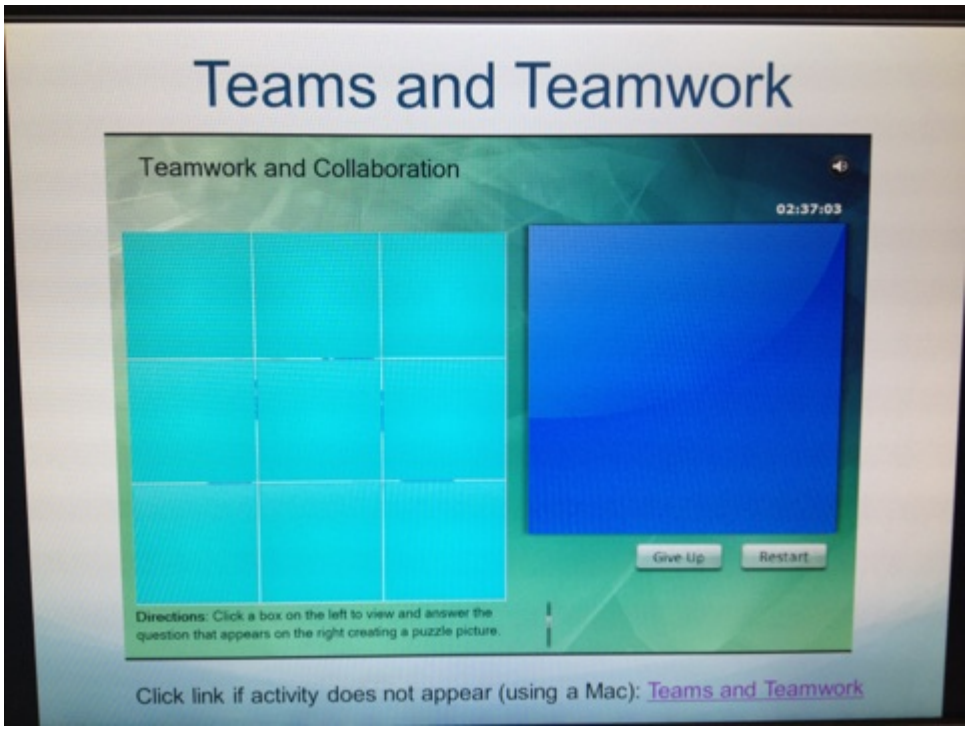


Figure 1-Puzzle Matching Game

Figure 2- Spin Board Matching Game

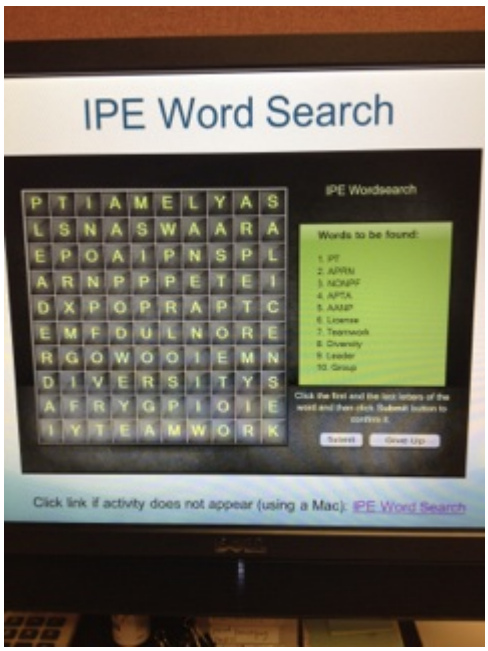


Figure 3- Find the Words Game

Figure 4- Leadership Matching Game

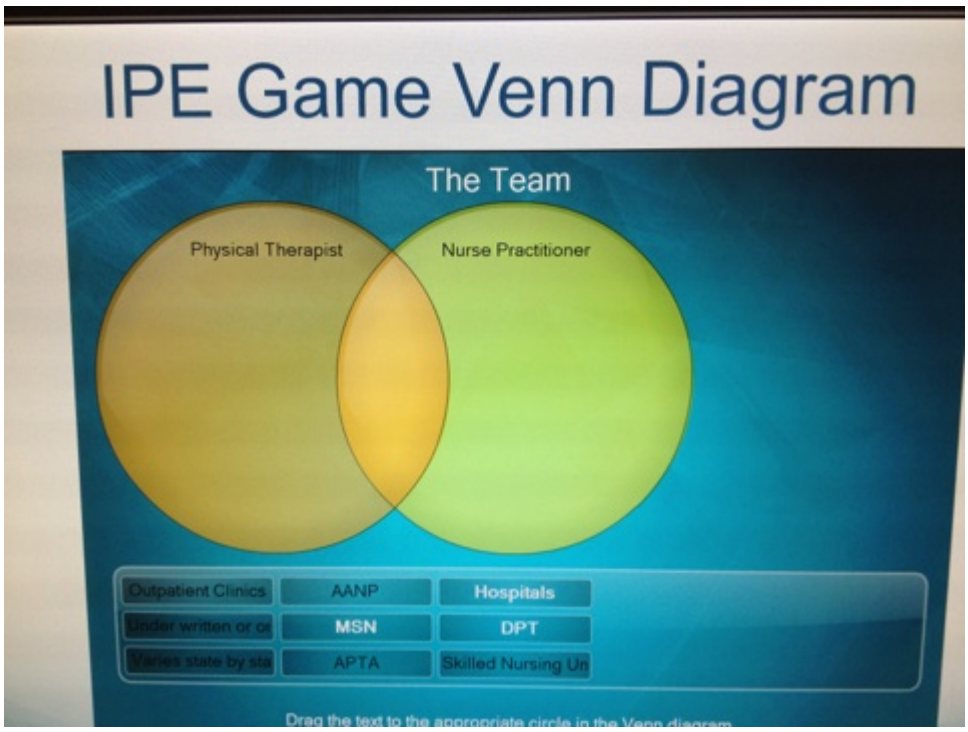


Figure 5- Venn Diagram Matching Game

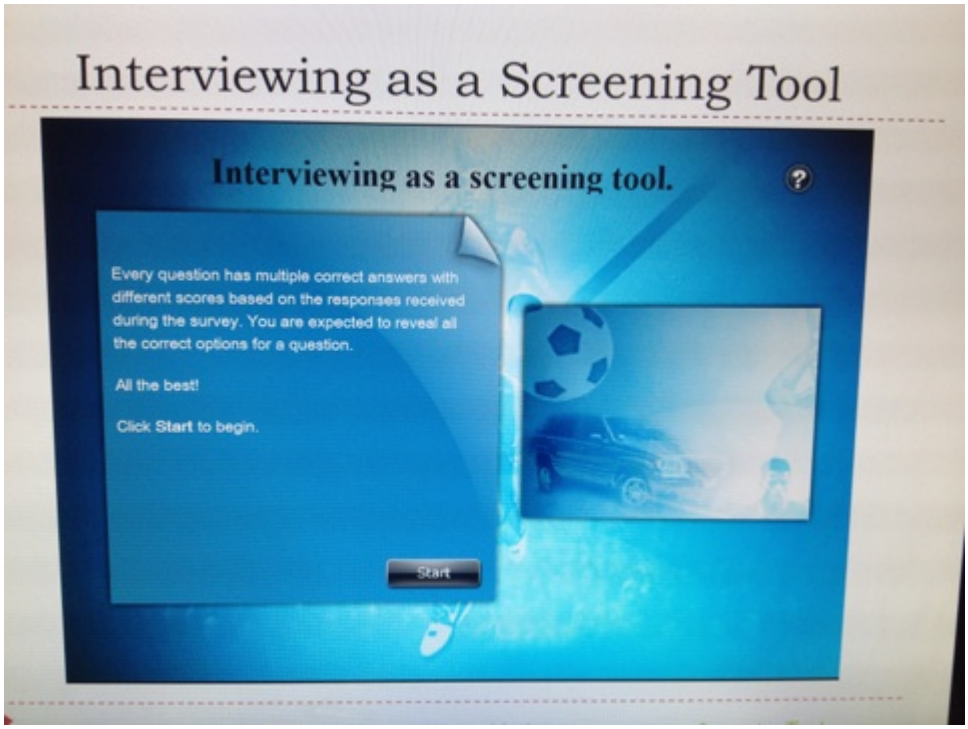


Figure 6- Interview Multiple Choice Game

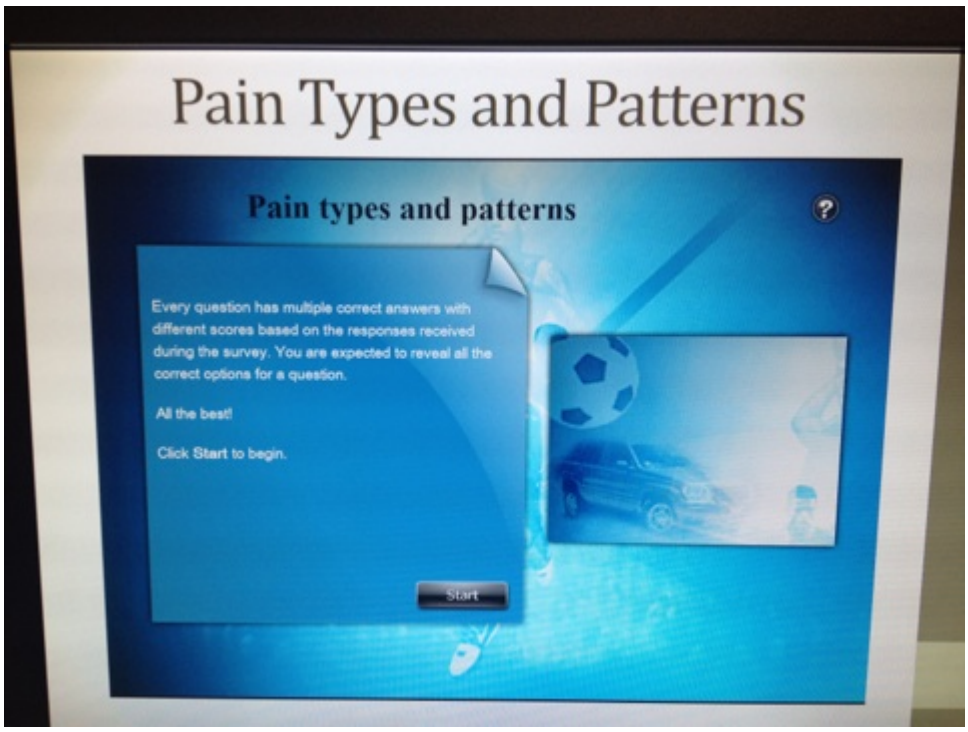


Figure 7- Pain Patterns Multiple Choice Game

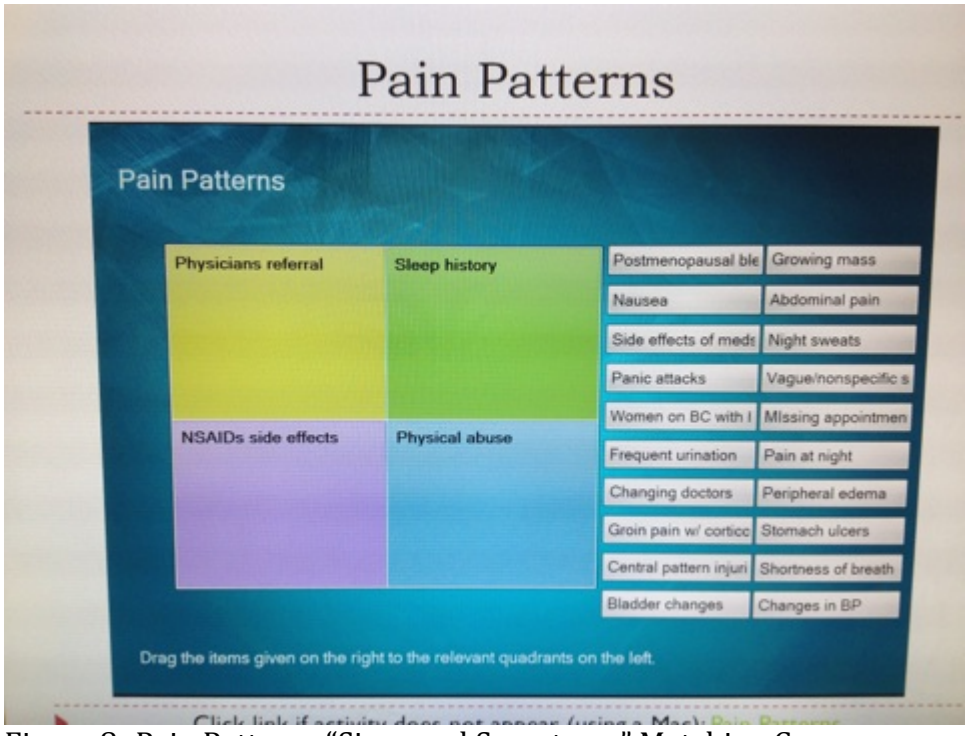


Figure 8- Pain Patterns "Signs and Symptoms" Matching Game

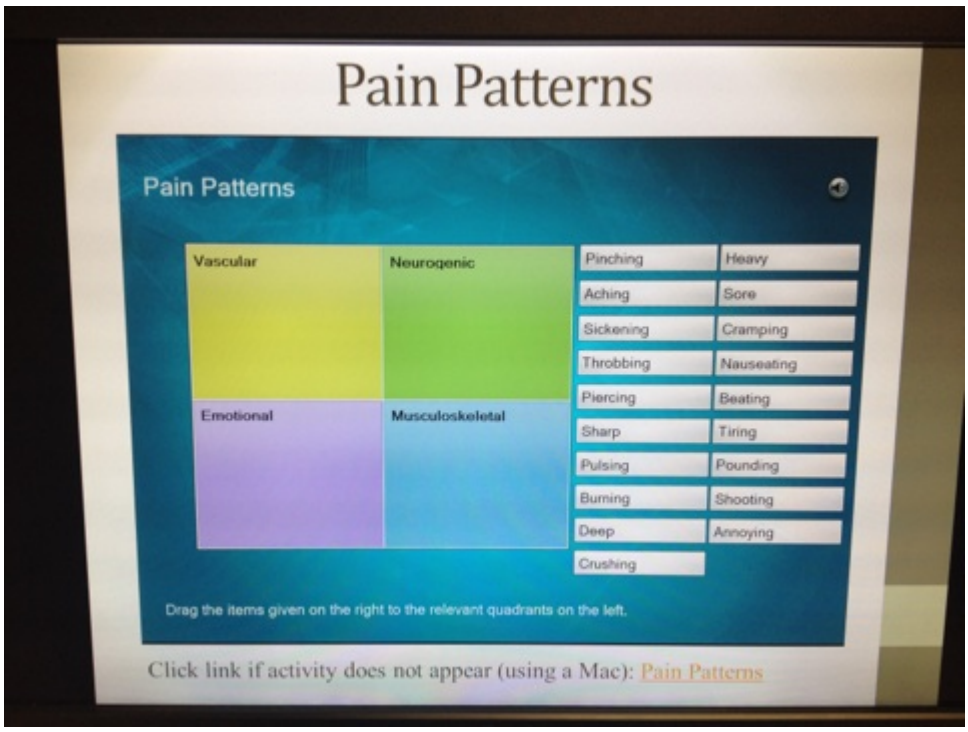


Figure 9- Pain Patterns "Types of Pain" Matching Game

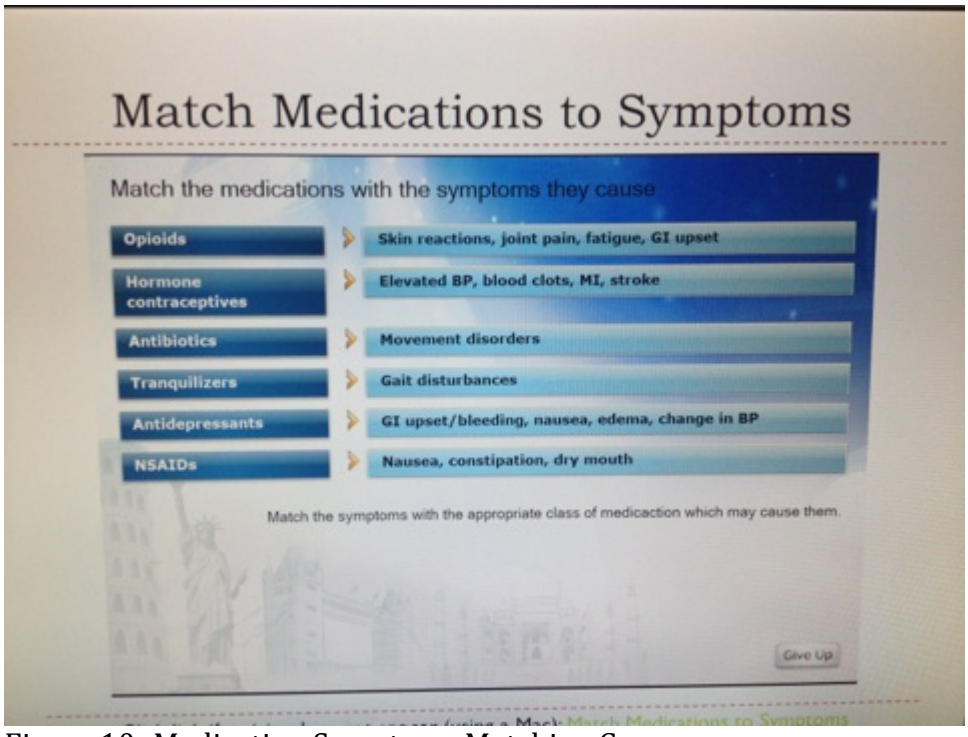


Figure 10- Medication Symptoms Matching Game

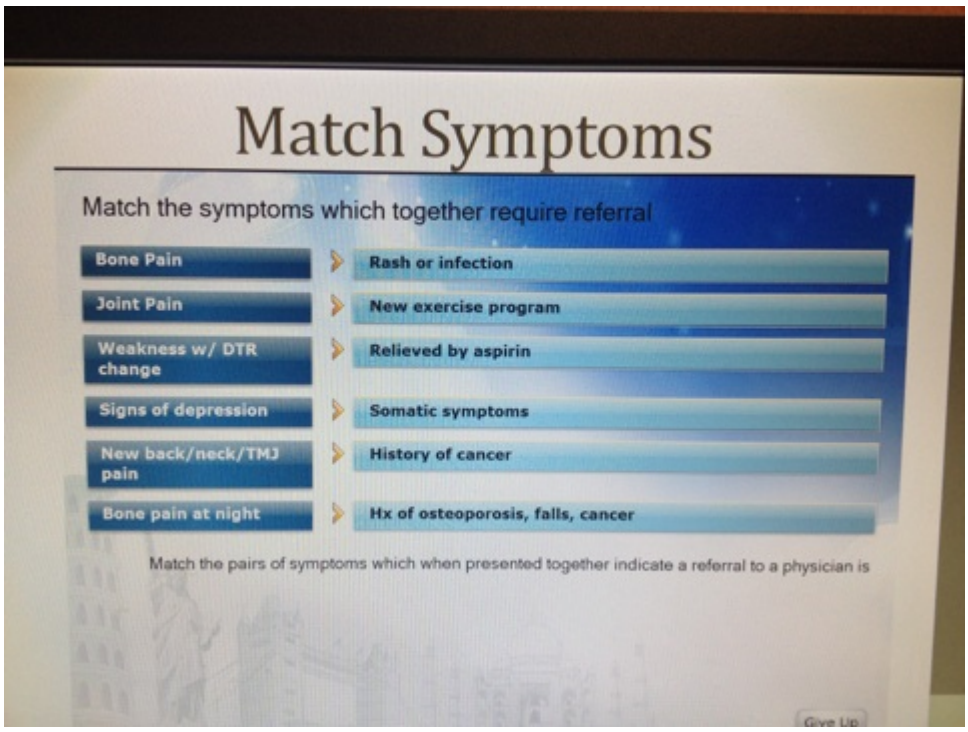
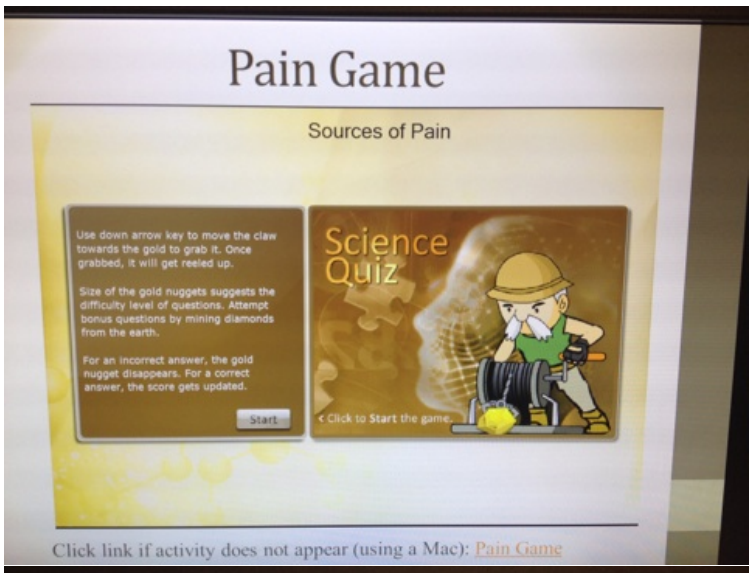
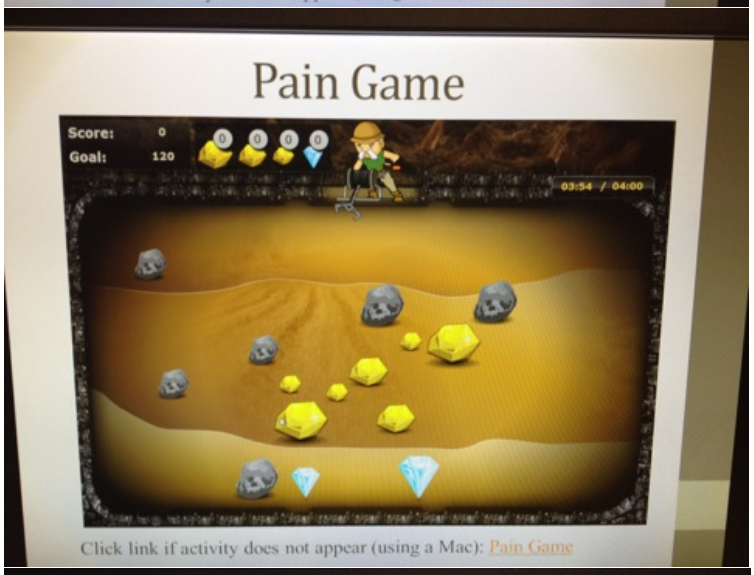
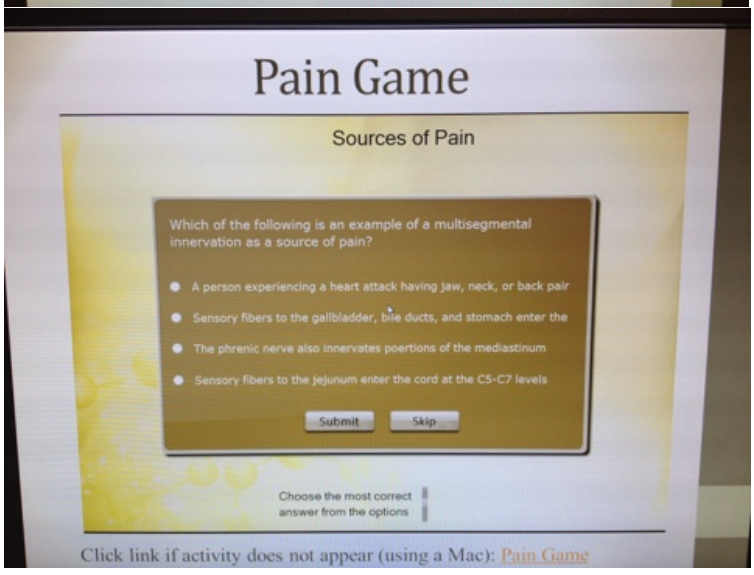


Figure 11- Symptoms of Different Types of Pain Game







Figures 12-14- Mine the Gold Game

Appendix 2 – Raptivity Instructional Media Survey

Raptivity Instructional Media Survey

Investigators: Heather Braden & Patricia Simpson, Department of Nursing and Rehabilitation Sciences, Angelo State University. Phone: 325-942-2581

This research is conducted in connection with an approved project by the Angelo State University Institutional Review Board for the protection of human subjects in research and research related activities. You are required to give your consent prior to participating. Refusal to participate will have no effect on any future services you may be entitled to from the university. Anyone who agrees to participate is free to withdraw at any time without penalty.

Purpose: This study is designed to determine the usefulness of instructional media in bridged face-to-face/online learning modules for understanding and utilization of interprofessional collaboration by physical therapy (PT) and nurse practitioner (NP) students.

Procedures: As you participated in your current assessment course, you experienced instructional media content. This survey is to collect some of your opinions about the experience.

Risks: There are minimal risks or costs to you as a participant in the study. The main cost of your participation is the estimated 10 minutes of time it takes to complete the Raptivity Survey. We thank you for your time.

Benefits: The benefit to you as a participant includes your role in helping to identify aspects of instructional media that are effective for learning in graduate physical therapy and nursing programs.

Confidentiality: Participation in this study is voluntary and involves minimal loss of privacy. We ask for your Student CID to as a mechanism for ensuring that you have experienced the Raptivity Instructional Media content that the survey concerns. Once that is confirmed, your student CID will be removed to de-identify your particular responses. The investigators (including your instructor) will have access only to the de-identified data. Your responses to the survey wil be used only in combination with the answers of other participants to produce statistical composites of the survey results.

For more information about the Raptivity Survey please contact the Investigators at the phone number listed at the top of this page.

If you do not wish to participate in the survey, please close your browser now!

To start the Raptivity Instructional Media Survey, please use the space below to fill-in your Student CID and indicate your willingness to participate by clicking the button indicating your consent. Then click the NEXT button at the bottom of the page to proceed.

Enter your Student CID: _____

I understand the purpose, procedures, risks, benefits, and confidentiality provisions for the Raptivity Instructional Media Survey, and:

❑ **I consent to participate**

Which ASU professional degree program are you pursuing?

❑ **Nurse Educator (NE)** ❑ **Family Nurse Practitioner (FNP)** ❑ **Doctor of Physical Therapy (DPT)**

Indicate your agreement or disagreement with each of the following statements. Base your answers on *COMPARISON* of the *LEARNING MODULES THAT USED GAMING TECHNOLOGY WITH THE MODULES THAT DID NOT* include the games in this course.

	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree
The content was more fun and enjoyable to learn using the games.	❑	❑	❑	❑	❑

	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree
Interacting with the games encouraged me to complete reading assignments on schedule.	❑	❑	❑	❑	❑
The games improved my ability to remember the learning material.	❑	❑	❑	❑	❑
The feedback from the games reinforced my knowledge of the subject matter better than the feedback I got when the games were not used.	❑	❑	❑	❑	❑
The gaming technology kept me more engaged in the the learning process than I usually am.	❑	❑	❑	❑	❑
I was more motivated to learn using the games than without them.	❑	❑	❑	❑	❑
The games kept me more alert to details about the content than I was when not using the games.	❑	❑	❑	❑	❑
Something about the games makes it easier for me to use or apply what I learned to other situations.	❑	❑	❑	❑	❑
Learning through the games made it easier to refer back to the material for exams or quizzes.	❑	❑	❑	❑	❑

Based on *YOUR EXPERIENCE* with the gaming technology in this course, how much do you agree or disagree with each or the following statements:

	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree
The game instructions were easy to understand and follow.	❑	❑	❑	❑	❑
Interacting with the gaming technology was difficult.	❑	❑	❑	❑	❑

The gaming experience improved my overall comprehension of course materials.	❑	❑	❑	❑	❑
My level of achievement in the course was increased by the gaming experience.	❑	❑	❑	❑	❑
I think gaming technology should be used for other courses in my field of study.	❑	❑	❑	❑	❑

Thank for completing the survey! Please click SUBMIT below before you close your browser.

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