Assessment of Commonly Used Training Techniques and their Overall Effectiveness on the Younger Workforce

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Abstract: Composed mostly of millennials and baby boomers, today's workforce brings together a diversity of individuals having different motivations, work styles, and priorities. These cohort differences are thought to have an impact on how employees learn and may respond to different training methods. The purpose of this study was to determine if safety training that was designed with millennials in mind would be better received than more traditional training methods. Traditional training methods included PowerPoint with no interactive activities or videos. The "millennial" training modules were interactive and included videos. Data were collected and analyzed from a sample of 30 college-age participants (age 18-31 years, median = 22 years, 50% male). Participants were randomly given the current safety training modules (Set A; "traditional") or the author-created safety training modules (Set B; "designed with millennials in mind") to view first. After viewing a set, they were given a quiz on the information within it. This was repeated after viewing the second set. Quiz questions were exactly the same but the order in which they appeared was randomized. At the end of the experiment, participants were given a survey related to their perception of the training. Results indicated that participants scored better on the "millennial" training module both in terms of mean quiz score values and their personal perceptions (overall engagement levels). Furthermore, perceived engagement of the two modules sets were found to be significantly different from one another. Results from the study indicate that having training methods that engage the employee through videos or interactive activities may not only be preferred by our younger employees, but the technical information may be better learned.

Keywords: Training, Millennials, Learning Styles

1. Introduction

Over the past few years, millennials have been entering the workforce at an ever-increasing rate. Soon, if not already, millennials will have become the largest presence within the workforce as the baby boomer generation increasingly retires. While the exact dates of the millennial generation vary by source (Pew Research states after 1980), an estimated 75 million Americans born during this timeframe are taking the workforce by storm (Farrell & Hurt, 2014). As more and more of these young millennials start to enter the workforce, it is important to note that young workers tend to be more likely to be injured at work than older workers (Breslin and Smith, 2005; Laberge and Ledoux, 2011).

Multiple studies over the past several years have begun to look into what environment the millennial generation learns best in and which techniques help them to retain the most information. As a result of these studies it has been noted that the traditional lecture style format of training and teaching is now becoming ineffective because technology has increased the need for a more hands-on learning experience. Simply filling out a PowerPoint with detailed information is no longer effective in keeping the millennials attention and allowing for maximum retention of the information. It is noted that

great benefits can come from de-emphasizing lectures for millennial learners and integrating technology into classroom instruction (Werth & Werth, 2011). As such, the learning environment for millennials needs to be collaborative, active, intellectually challenging, and purposeful (Matulich et al., 2008). Bohl (2008) notes the importance of engaging millennials in the learning process. The purpose of this research was to test the theory that more engaging presentations would lead to better comprehension and preference.

2. Method

Thirty millennials within a southeastern Ohio city who responded to physical flyers and/or an email invitation participated within the study. They were all volunteers and compensated $10 for their time and participation. Participants were between the ages of 18 to 31 (Median = 22.1 years and STD= 3.3 years) with the participants evenly split among male and female (15 male participants to 15 female participants).

The materials for the study consisted of six PowerPoint presentations (accessed via laptop), handouts of the slides for the six PowerPoints, headphones to listen to specific aspects of the PowerPoints, a Post-Module Quiz, and a Data Collection Form. All aspects of the study were approved by the author's research ethics board prior to data collection and individuals participated on an informed consent basis.

The six PowerPoints were split up into two separate categories based on how they presented their information (hereby referred to as Set A and Set B). Set A consisted of previously existing safety training modules found throughout the internet. The modules were taken from the NIOSH *Youth@Work - Talking Safety (*referenced as TS) curriculum, the Electrical Safety OSHA 11 (referenced as OSH) curriculum taken from the Young Worker Safety Resource Center, and the *Young Worker Safety and Health Training for the Culinary Industry* (referenced as CUL) curriculum taken from the Center for Young Worker Safety and Health at Georgia Tech Research Institute. These modules were modified only slightly, in that slides were taken out that were not meant to be part of the study so as to decrease the participant study time. No judgement was made on the quality of this training—the sets were chosen because they had content for safety training for young workers and they included the types of training technique that were part of the experimental design. Set B consisted of author created training modules pertaining to the exact same information that is within Set A. The author-created these modules with the mindset of building a training module directly for the millennial generation. As such, specific training techniques were used that the author feels would appeal to the learning styles preferred by the generation. These techniques are shown in Table 1. The differences in training techniques used by the two sets is laid out in Table 1 below.

Table 1. Different training techniques used by Set A and Set B

Training Technique	Appears within Module in	
	Set A	Set B
Quizzes (Visual & No Feedback)	TS	
Videos (Life Lessons)	TS	
Interactive Games (Seek & Find)	TS	
Story Telling	TS,OSH,CUL	
GIFs		TS,OSH,CUL
Videos (TV related & Situational)		TS,OSH
Quizzes (Interactive w/ Feedback)		TS,OSH
Interactive Games (Choose the Right Path w/ Feedback)		OSH,CUL

3. Results

The 30 participants ranged in age from 18 to 31, as previously mentioned, with a mean age of 22.1 years (SD = 3.3) and split evenly among men and women. The participants number of jobs held previously ranged from 0 to 8 years (mean = 3.52, SD = 1.99). Participants were randomly given either Set A or Set B to view first as chosen by the author. Half were given Set A first while the other half were given Set B first.

3.1 Engagement and Perception of Training Techniques

The data collection survey given at the end of the study utilized a Likert Scale to measure the participant's perception of the effectiveness of the different training techniques used throughout the study as well as how well they felt each technique better prepared them to answer the quiz questions. The median perceived effectiveness for training techniques in Set A ranged from a low of 5 for the Quizzes (Visual & No Feedback) to a high of 8 for the Videos (Life Lessons). Set B ranged from a low of 7 with the GIFs to a high of 8.5 for the Quizzes (Interactive w/ Feedback).

In order to further analyze this data, the nonparametric Mann-Whitney U-test was performed to determine if significant differences existed in training engagement. Results indicated that a statistically significant difference existed (p-value of 0.002) and that Set B (interactive one) had a higher median score. The median score for Set A was 7 and the median score for set B was 8.

3.2 Multiple Choice Quiz on Recall

The multiple-choice quiz results were used to measure participants' ability to recall what they had just been taught within the module sets. The results for the multiple-choice test are shown in Table 2 below in terms of the mean values of the Sets, mean values of the content (training techniques), and mean values of Set*Content.

Table 2. Mean Values of Multiple Choice Quiz Set A vs Set B

Term	Fitted Mean	SE Mean
Set		
A	3.7	0.11
B	4.2	0.11
Content		
Culinary	4.0	0.14
OSHA	4.1	0.14
TalkingSafety	3.7	0.14
*Set*Content*		
A Culinary	3.6	0.19
A OSHA	3.9	0.19
A TalkingSafety	3.5	0.19
B Culinary	4.4	0.19
B OSHA	4.3	0.19
B TalkingSafety	3.8	0.19

Figure 1 below shows the Interaction Plot for score for the Set*Content Term. Values used for this plot come from the fitted means seen in the table above. Similarly, Figure 2 below shows the Main Effects Plot for Score of both Set and Content individually. As with Figure 1, values are taken from the fitted means seen in the table above.
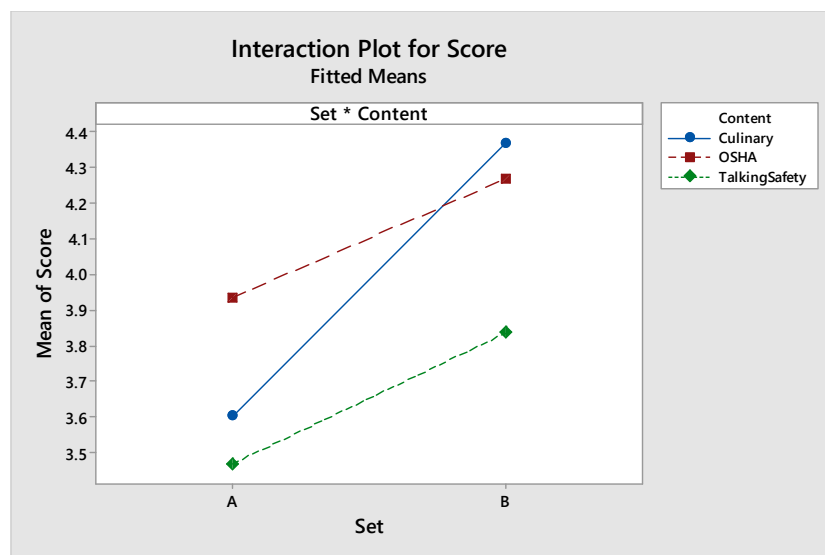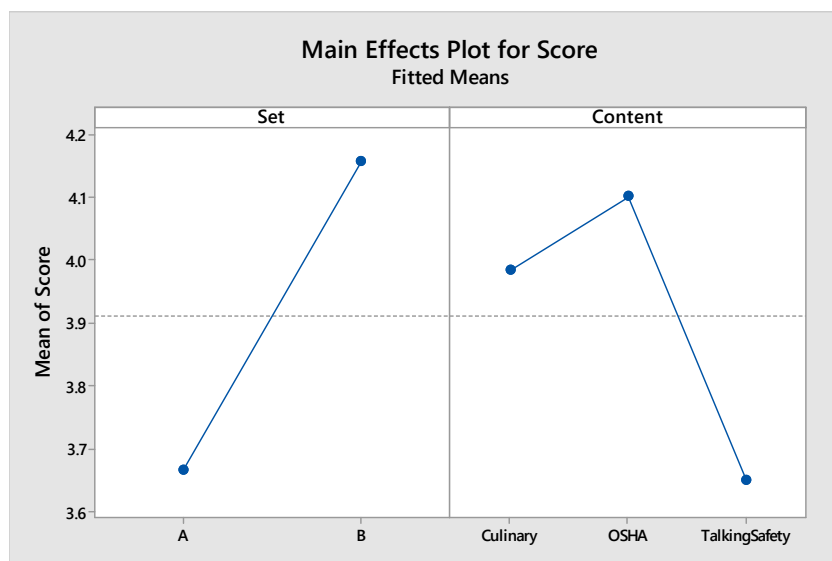
Figure 1. Interaction Plot for Score

Figure 2. Main Effects Plot for Score

Figure 1 above shows the interaction plot for quiz scores in terms of Set*Content. As evident within the plot, Set B scored quite better in all three content categories compared to that of the Set A categories. Similarly, Figure 2 above shows how the sets compared to each other as well as how participants fared in terms of different content types. There was a sharp uptick in mean score values for Set B compared to that of Set A. Similarly, quiz questions coming from that of the Culinary and the OSHA modules fared better than that of the questions coming from the Talking Safety module. For further analysis of the mean score values, an ANOVA test was performed.

As previously stated, the next step in analysis of the quiz score data was done via an ANOVA test. The data findings can be found in Table 3 seen below.

Table 3. Analysis of variance for the multiple-choice quiz

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Set	1	10.756	10.7556	9.57	0.002
Content	2	6.544	3.2722	2.91	0.057
Set*Content	2	1.744	0.8722	0.78	0.462
Error		174	195.533	1.1238	
Total		179	214.578		

While analyzing the data from the ANOVA test, it is determined that the Set type is associated with the different score values as the p-value for Set is below the significance level of .05. However, neither the Content nor the interaction between Set*Content are significant because of their p-values lie above the significance level of .05.

3.3 Qualitative Data

Of the 30 participants who completed the study, nearly 87% (26 out of 30) considered themselves to be visual learners over a verbal learner. When asked about previous work experience, 63% (19 out of 30) of participants reported that at least one of their previous jobs did not require safety training and 20% (6 out of 30) of participants reported never being required to complete a safety training at any job previously held. Of the 24 participants that reported having completed at least one safety training in the past, 33% (8 out of 24) found the training received to not be useful or engaging to them in any way.

Roughly three out of every four participants (73%) reported that they felt module Set B helped them to best prepare for the quizzes given at the end of the viewing. Similarly, 80% (24 out of 30) participants reported that module set B conveyed the information in the most effective manner.

4. Discussion

4.1 Summary of Findings and Interpretation

When determining the overall effectiveness of training techniques used, it was shown that there was a statistically significant difference between the mean values of the scores given for the training techniques used in Set A versus those used in Set B. These results indicate that the more interactive training modules led to higher engagement and better retaining of information.

From the ANOVA results, we can see that both the content type and the Set*Content factors were not significant. The only factor that provides significance towards the quiz score results is the actual set. Thus, it can once again be concluded that the set type itself (Set A versus Set B) has a direct impact on the participant in terms of retention of information when quizzed on the material.

4.2 Study Limitations and Conclusion

Several limitations appear to exist within this study. The modules used within Set A were taken from previously published safety training modules and were designed for the viewer to receive this information in lecture form; however, participants viewed and read each module on their own. Similarly, modules within Set A needed to be shortened in order to create a study that fit within the desired time constraints (around 30 minutes). Certain slides were removed from the original Set A modules. Meaning that the removed slides could have had a more positive impact on the outcome of the study. Finally, sample size was small with this study having only 30 participants. It is recommended that more participants be involved with the study on any follow ups to this research.

In conclusion, even with the small sample size and other contributing limitations, results show a significant impact of Set B on participants, increasing both mean quiz scores as well as the mean engagment of training techniques used within the Set. Follow up research should be done in order to confirm these findings as well as studies testing the effectiveness of this new type of training, such as virtual reality or augmented cognition, within a workplace setting to determine the accuracy of these results.

4. References

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