

Introduction

As new technologies emerge the question begins to arise: "What factors influence an individual's adoption of a new technology and how can we increase adoption?" In this study, we attempt to answer this question as it relates to virtual world usage. A virtual world is a computer-simulated environment in which a user can interact with the world and other users. In this study, we are interested in current perceptions towards virtual worlds and the factors that influence their intention to use a virtual world. We will attempt to predict an individual's intent to use a virtual world with respect to their perceptions measured by several variables. We will also attempt to make suggestions for increasing intent to use a virtual world.

Methods

We were interested in exploring the intention of an individual to use a virtual world and the factors that influence their intention. This study examined survey respondent's intent to use a virtual world and various beliefs related to virtual world use. The dependent variable, Intention, and independent variables competition, effort, negative image, not real, novelty, opportunity cost of money, opportunity cost of time, performance, and special influence are aggregate scores calculated from the average of 3-4 questions related to each category based on the unified theory of acceptance and use of technology (UTAUT). The survey was designed using a 7-point Likert scale ranging from Strongly Disagree to Strongly Agree. A numerical value of 1 (strongly disagree) to 7 (strongly agree) was then assigned to each response to find the mean variable score for each respondent. Reliability analysis was conducted using Cronbach's alpha to determine how well each question in their respective variable groups related to

constructing the aggregate score of each variable. A cutoff of .8 was used as each of the variables are previously accepted constructs based on UTAUT and Goh & Yoon. Each variable was identified as either an inhibitor of virtual world acceptance or a facilitator of virtual world acceptance. Demographic characteristics include age, employment, gender, and previous virtual world use.

Previous research typically identifies inhibitors towards technology acceptance. This study includes facilitators to improve strategies to increase the usage of virtual worlds. Facilitators were identified as hedonic expectancy, competition, effort, novelty, performance, and social influence. Inhibitors were identified as negative image, not real, opportunity cost of money, opportunity cost of time, and no value. The survey was distributed to college-age students at a university in the Southeast United States. 409 surveys were used in the final dataset with no missing data. We began by performing descriptive statistics to understand current perceptions and attitudes toward virtual world acceptance based on the central tendency of the variables. Descriptive statistics were summarized using means and standard deviation, kurtosis and skewness for continuous variables, and counts and frequencies for categorical variables. Previously conducted simple linear regression to predict the correlation of each variable on intention was summarized and expanded using multiple linear regressions for facilitators, inhibitors, and all variables together to measure the correlation of each variable on intention controlling for other variables. Analyses were conducted using Excel 2023 and SPSS 29.

Reliability Analysis

All variables with the exception of novelty, competition, and opportunity cost of money had acceptable Cronbach's alpha $>.8$. For novelty, question 1 "I have used a virtual world before this survey" was not correlated with the other questions with $r = .212$. This makes sense as agreement with the other three questions indicates that the respondent did not have prior knowledge of virtual worlds. Question 1 indicates that the respondent did have prior knowledge if they agreed with the prompt. Omitting this question results in $\alpha = .824$ increased from $\alpha = .746$. Competition was not consistent with $\alpha = .758$. Reviewing the prompts indicates that two of the prompts relate to annoying or grieving other players while two indicate true competition. A competitive player may not find grieving enjoyable. Separating these two prompts into their own category may give a more accurate measure of true competition. It is reasonable to believe that the mean competition score may be higher if it separated those two questions. Opportunity cost of money was not consistent with $\alpha = .798$. Similar to competition, two of the questions used for this variable may be better separated. Two relate to true opportunity cost indicating that although an individual may have the money, they would just rather use it for something else. The other two indicate that a virtual world is simply too expensive regardless if they want to spend money on it or not. Two variables related to cost/expense and opportunity cost may give more accurate results.

Results

The average age of survey respondents was 21.73 ± 2.7 . 30(7%) respondents were unemployed, 188(46%) were employed part-time, and 191(47%) were employed full-time. 216(53%) were male and 193(47%) were female. 297(73%) had no prior experience with a virtual world while 112(27%) had prior experience. Our dependent variable was intention.

Intention scores a respondent's plan or intent to use a virtual world. The average of three questions was used to create the individual's aggregate score of intention. A lower score indicates that a respondent disagreed with having a plan or intent to use a virtual world. A higher score indicates that the individual did plan to use a virtual world. The survey results show that few respondents were planning to use a virtual world with a mean score of 2.51 ± 1.6 . The median score was 2 and the most frequent score was 1. The data are heavily right-skewed, indicating that the overwhelming response was disagreement towards planning to use a virtual world. This suggests a need to understand why intent to use a virtual world is low.

Previously conducted simple linear regression between each variable on intention indicated a significant impact for every variable at $\alpha = 0.05$. Opportunity cost of time had the largest impact on intention with $\beta = -0.67203$ and explained approximately 24% of the variation in intention. A predicted decrease in intention of .67 can be expected for every one-unit increase in opportunity cost of time. Opportunity cost of time scores were heavily left-skewed with an average of 5.9 ± 1.15 and a median of 6.33. The overwhelming majority of respondents felt using a virtual world would be a waste of time. Hedonic expectancy had the second largest impact on intention with $\beta = .62315$. A predicted increase in intention of .62 can be expected for every one-unit increase in hedonic expectancy. The average score was 4.0 ± 1.54 . Respondents were likely to perceive virtual worlds as exciting or fun. Without controlling for other variables, efforts should be allocated toward improving hedonic expectancy and decreasing the opportunity cost of time.

We now expand upon the simple linear regression to control for other factors. Using multiple linear regression expands on previous models to increase predictive accuracy and test

for interaction effects. All models were tested at $\alpha = 0.05$. Our first model used only the facilitator variables hedonic expectancy, competition, effort, novelty, performance, and social influence. Previous simple linear regression indicated that each of these variables were significant predictors of intention. Controlling for other facilitators, competition, and effort were no longer significant. The model was significant and explains approximately 43% of the variation in intention. Hedonic expectancy remains the greatest predictor among facilitator variables with $\beta = .3776316$. The second greatest predictor was novelty with $\beta = -0.207777$. Performance and social influence had $\beta = .1548512$ and $\beta = .1584862$ respectively. Each beta coefficient decreased from the simple linear regression model as expected as we are controlling for other variables. Our model suggests that the perception of enjoyment, an individual's believed impact on productivity and performance, and the belief that an individual's social circle believes they should use a virtual world, are strong facilitators for virtual world use. Efforts to facilitate virtual world use should be allocated towards these variables. Novelty was believed to be a facilitator however our model suggests that the newer a virtual world is to an individual their intention to use a virtual world decreases.

Our second model considered only inhibitor variables. The model was significant and explained about 34% of the variation in intention. When controlling for other factors only the opportunity cost of time and no value remained significant with $\beta = -.38574097$ and $\beta = -.1268808$. Similar to model 1, all beta coefficients have decreased which is to be expected when controlling for other factors. This model suggests that when controlling for other variables, only the opportunity cost of time and no value has a significant impact on intention. Efforts to decrease inhibitors should be focused on these areas.

Our last multiple regression model considered all facilitators and inhibitors together. Combining all variables may give a better overview of the factors that should be considered. The model was significant and explains approximately 46% of the variation in intention. With all variables combined, hedonic expectancy becomes the greatest predictor of intention with $\beta = .279805$. The largest predictor in our simple linear regression model was opportunity cost of time, which remains significant but decreases to the second greatest predictor with $\beta = -.23262504$. Performance is no longer significant when controlling for all variables. Novelty, social influence, and no value remain significant at $\beta = -.186811$, $.12739493$, and $-.1268801$ respectively. This model indicates the perceived enjoyment of virtual world use is the strongest predictor of intention. Similarly, social influence to use a virtual world increases intention. If others believe an individual should use a virtual world their intent to use one increases. If an individual does not believe a virtual world is valuable their intention decreases as expected and if the opportunity cost of time is too high an individual will not intend to use a virtual world.

Discussion

Predictors of virtual world use include enjoyment of using a virtual world and social influence to use one. Individuals who would enjoy using a virtual world are predicted to have higher intentions to use a virtual world. This is to be expected as virtual world use is largely perceived to be an activity for enjoyment rather than utilitarian use. Similarly, an individual who is influenced by their peers to use a virtual world is more likely to use a virtual world. The novelty of virtual worlds is an interesting case as we originally believed this would be a facilitator. However, we observed a decrease in intention with an increase in novelty. It was believed that a new idea may encourage use. Upon further research, it seems that new

technology that relies on a user base needs to reach a critical mass before novelty can be a facilitator. In the case of virtual worlds, the intent is to interact with the world and players inside the world. If this critical mass has not been reached, the novelty of its use can be a detriment. The significant inhibitors include no value and opportunity cost of time. An individual is not predicted to use a virtual world if they believe they would receive no value in doing so or if they believe it is a waste of time. There is a larger percentage of variation in intention in the facilitator model than in the inhibitor model. This suggests that efforts to increase virtual world use may be more beneficial if focused on facilitators. This is contradictory to previous research that focuses on inhibitors for technology adoption. Further efforts to decrease inhibitors should be allocated towards the opportunity cost of time as it is the strongest inhibitor of virtual world use.