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Full Length Research Paper

An enhanced acceptance model for exploring user intention towards virtual reality environment: Partial least squares (PLS) statistical method

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As technology advances, virtual reality (VR) technology is widely used in many areas such as medicine, entertainment, engineering and education training. Teachers adopt VR system in their teaching courses increasingly. Good teaching and learning can lead to better learning results for students. Students should have better learning outcomes by combining VR's characteristics with teaching. This study investigates the willingness of teachers who use VR system to educate students and understand the relevant factors of improving the use of VR system. The model developed in this study adopted technology acceptance model (TAM), flow theory and motivation-hygiene theory. The result revealed that VR system is indeed useful for teaching, while individual and external factors such as the external environment can improve the willingness of teachers to accept VR systems in education.

Key words: Virtual reality, technology acceptance model (TAM), motivation factors, hygiene factors, flow theory.

INTRODUCTION

In recent years, virtual reality (VR) is extensively applied for many domains and it has great possibility for e-learning in education. In VR environment, users can sense with some feedback as optic, three-dimensional image, multiple perspectives and auditory. Users can interact highly and get various stimuli in a VR world (Limniou et al., 2008; Lui et al., 2010). VR is considered as a probable technology and tool for many ways such as simulation and exercise, and it has frequent interaction and diverse incentives to easily let users into a computer created world (Limniou et al., 2008; Liu et al., 2010).

Teachers' self-efficacy is defined as trusting a teacher's ability to affect students' learning. Some reports expressed that a teacher who has better teaching efficacy tends to spend more time (Riggs and Enochs, 1990), and the self-efficacy are highly related with the learning achievement (Ashton and Webb, 1986) and the learning motivation (Midgley et al., 1989). Teaching motivation factors are also as essential factors for good learning. Attention should be drawn from the course plan, the learning conditions (Govender, in press) and the elements that urge them to learn (Jenkins, 2001; Law et al., 2009; Yin et al., 2007).

The purpose of this research is to explore the acceptance and factors of using VR teaching system. The current research combines flow theory with motivation-hygiene theory based on technology acceptance model (TAM) becoming an enhanced model to applicably explore our issues.

LITERATURE REVIEW

We adopted three theories which are applicable to our

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research. The modified model combined TAM, motivation-hygiene theory and flow theory.

Technology acceptance model (TAM)

Davis (1986, 1989, 1993) brought the TAM to inquire the technology that influenced user's behavior. Since Davis proposed TAM model, the extent of technological acceptance was measured based on several methods (Adams et al., 1992; Igbaria et al., 1995; Mathieson, 1991).

However, TAM model only need general data to know whether users adopt a technology or not. If we have further information in various fields of analysis, the technology will be led to the right development (Mathieson, 1991).

The model is that ''Perceived Usefulness (PU)" and ''Perceived Ease of Use (PEU)" can impact an individual's intention to use a technology. PU is a user who uses the technology to feel if the technology can raise the work, and PEU means a user did not spend a lot of time learning how to use the technology (Davis, 1989).

Some researches have found some factors like technological complexity, environmental and personal element to develop the TAM (Cheung and Huang, 2005; Hasan, 2006; Ngai et al., 2007). It has inspected the correctness of the TAM model using a difference of environments, and technologies, such as: e-mail, network, and e-commerce (Gefen, 2003; Lederer et al., 2000; Zhang and Prybutok, 2004).

Motivation-hygiene theory

Herzberg found motivation and hygiene factors, which might affect the employer's satisfaction and dissatisfaction in the workplace. The motivating factors are those that are related to an individual and have the capacity such as: achievement, competency, status, recognition, achievement, personal growth and self-realization, thus making him satisfied. However, job characteristics do not lead to sadness and discontent; instead, discontent results from detrimental assessments of such job-related factors as: company policies, supervision, technical problems, salary, interpersonal relations on the job, and working conditions. These are called hygiene factors. If management is related with both, then managers must attend to both sets of job factors.

Learning and motivation affect many-side of human behavior. Motivating factors and learning became one of the important researches in the territory of education (Jenkins, 2001; Lynch, 2006). Motivation can promote learning and academic well (Linnenbrink and Pintrich, 2002; Lynch, 2006). VR programming course needs a lot of practicing. Learning will fail, if they have no motivation (Jenkins, 2001).

Cognitive and motivational variables are found inseparable (Pintrich, 1999; Stefanou and Salisbury-Glennon, 2002; Valle et al., 2003; Lee, 2010). Therefore, motivation was carefully investigated in learning. Previous investigations have found that the intrinsic and extrinsic motivations have significant impact on their learning performance. It was found that intrinsic motivation affects the drop-out rate to lower, higher learning, and is more pleasurable in school (Carlton and Winsler, 1998; Czubaj, 2004; Deci and Ryan, 2000; Kauffman, 2004; Moneta, 2004).

Flow theory

Flow theory was developed by Csikzentmihalyi (1991). Perhaps nothing can come out from it, and the experience is so interesting that people will do it even at more cost. Flow theory is called the optimal experience that people feel when they do with involvement (Csikszentmihalyi, 1977, 1997). When people are in the flow state, they become focused on their activities. They concentrate only specially on their on-going movement. This opinion has been applied in many ways, such as sports and gaming (Csikszentmihalyi, 1997).

Flow theory is complex and difficult to measure, so researchers usually measure it through multiple dimensions. Ghani et al. (1991) gauge the use of two constructions: enjoyment and concentration. Huang et al. (2010) contain four constructions: control, attention, inquisitiveness, and interest. Li and Browne (2006) have four elements to measure flow theory: attention, control, inquisitiveness and temporal dissociation. Koufaris (2002) developed three constructs, like enjoyment, control, and concentration. This paper adopted these dimensions. Perceived enjoyment means "the degree of using a system feels enjoyable" (Venkatesh, 2000). Perceived enjoyment is related to the motivator's factors on a technology acceptance, especially for amusement systems (Davis et al., 1992; Koufaris, 2002). All of the above, VR often has many interactive operation and we can get large enjoyment when using the system. We can thus expect that perceived enjoyment will improve the use of the system.

RESEARCH FRAMEWORK

Some common types of motivators and hygiene factors can be identified (Entwisle, 1998). This study focused on a set of factors that may influence the process and effectiveness of learning VR programming. Thirteen hypothesis hypotheses were thus proposed and illustrated.

Technology acceptance model (TAM)

The TAM has obtained support as an integrity and simple

model (Cheung and Huang, 2005; Drennan et al., 2005; Groves and Zemel, 2000; Liaw and Huang, 2003; Pan et al., 2003; Teo et al., 2009; Teo, 2009; Thong et al., 2002). PU means the extent in which an individual thinks that using a technology will improve his or her work performance (Davis et al., 1989), and PEU is directed at the extent in which the individual thinks that using a technology will be easy. PU and PEU are two essential concepts in the TAM model that compose a significant influence on attitude towards the technology, which in turn influence the intentions to use the technology (Cheung and Huang, 2005; Liaw and Huang, 2003). Besides, PEU affects PU and the latter has a direct influence on attitude towards the technology use (AT) and intention (IU) to use the technology (Hasan, 2006; Lee et al., 2011).

From the aforementioned researches, the following hypotheses were described.

H_1. PEU is positively associated with PU.
H_2. PEU is positively associated with the attitude towards the technology.
H_3. PU is positively associated with the attitude towards the technology.
H_4. PU is positively associated with the intention to use the technology.
H_5. Attitude towards the technology is positively associated with the intention to use the technology.

Motivation-hygiene theory

Motivation factors

Motivation factors mean the individuals like attitude and challenging goals rather than the factors of their surroundings. Intrinsically, motivation can be separated into three different parts: situational contingencies, motivational and performance processes and outcomes. It can be influenced by the individuals' feeling and the intrinsic motivation (Harackiewicz et al., 1987). A research showed a certain relationship between motivation factors and performance (Grant, 2008; Karatepe and Tekinkus, 2006; Lawler and Hall, 1970; Tierney et al., 1999). People tend to be highly absorbed and their representation improves when individuals' performance have motivation factors.

Individual attitude: Teacher and teaching jobs are connected as motivator factors (Dev, 1997). Expectancy theory (Vroom, 1964) opined that motivation has three constructs: expectancy, instrumentality and valence.

Challenging goals: It is important that personal challenging goals can decide performance (Harackiewicz et al., 1997; Harackiewicz et al., 1998; Lee et al., 2010). In the 1990s, Wofford, Goodwin , and Premack established the relativity between motivator's factors and goal attainment. When thinking need longer time, people's feelings are wider (Dweck et al., 1995).

Achievement goals are to reach the goal in your setting. A student's purpose is to perform better than others in a learning situation (Harackiewicz et al., 2002). This research uses a questionnaire methodology, so it is difficult to estimate the emotion factors on the learning of VR programming. Therefore, the emotion factors are not contained in this research.

H_6. Motivation factors are positively associated with learning attitude.
H_7. Motivation factors are positively associated with perceived enjoyment.
H_8. Motivation factors are positively associated with concentration.

Hygiene factors

Hygiene motivation is related to the environmental factors.

Reward and recognition: Rewards and recognitions may influence intrinsic motivation (Harackiewicz et al., 1987). It is believed that reward and recognition can be a key motivator of the learning (Jenkins, 2001).

Social pressure and competition: Social pressure such as peer competition influence learning (Chan et al., 2003; Rassuli and Manzer, 2005; Wellins et al., 1991). It has been investigated (Kotnour, 2000; Lee and Ertmer, 2006; Poell and Van der Krogt, 2003) and studied (Cavaluzzo, 1996; Katzenbach and Smith, 1993; Meyer, 1994; Roberts, 1997; Senge, 1990). The student's competition will increase to learn.

H_9. Hygiene factors are positively associated with learning attitude.
H_{10}. Hygiene factors are positively associated with perceived enjoyment.
H_{11}. Hygiene factors are positively associated with concentration.

Flow theory

This research adopts two aspects: perceived enjoyment and concentration. Perceived enjoyment means "the degree about the movement of using a technology was perceived to be enjoyable, apart from any performance that consequently results from technology use" (Venkatesh, 2000). Perceived enjoyment is an intrinsic motivation that has meaningful effect on a technology acceptance (Davis et al., 1992; Koufaris, 2002; Van der Heijden, 2004). It can bring them enjoyment when using

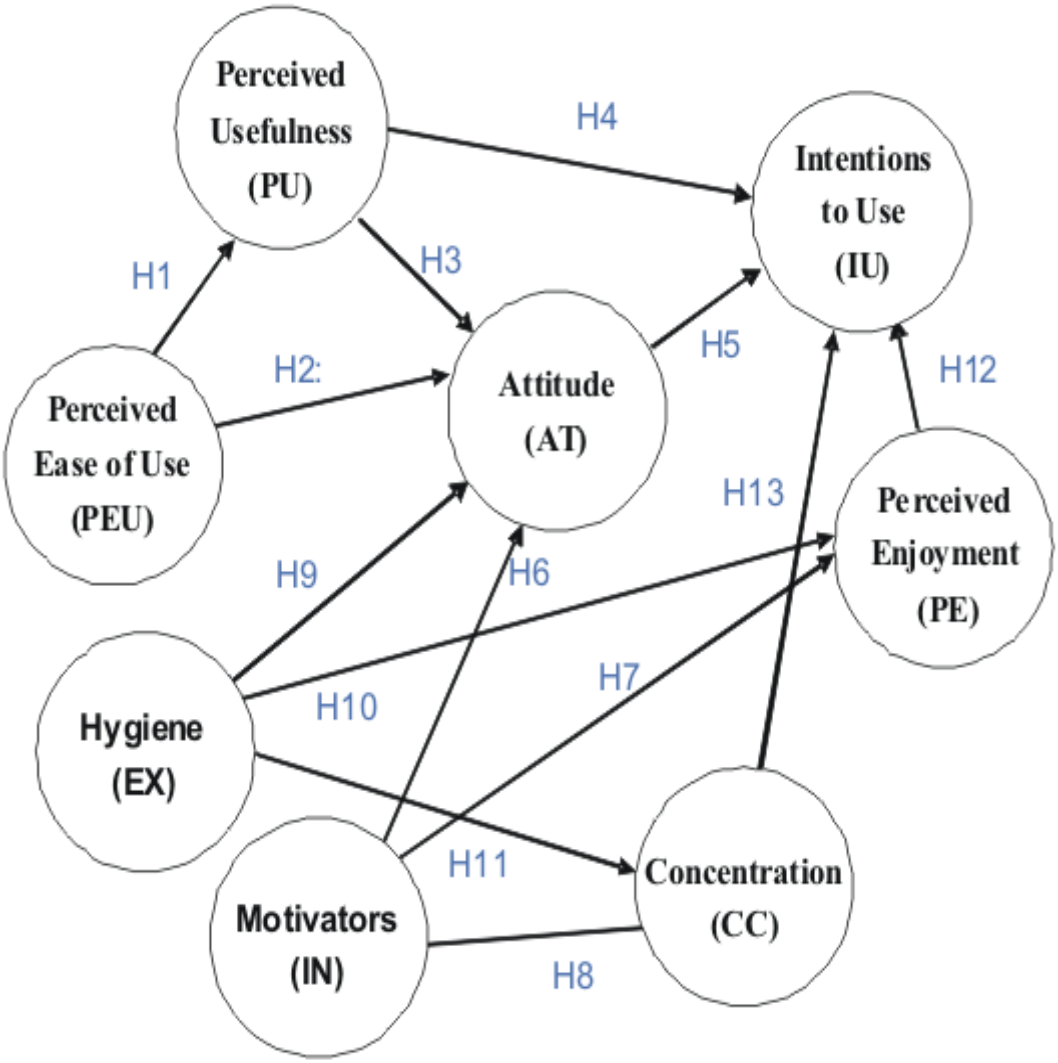

Figure 1. The research model of the research.

a technology. As shown earlier, users can get great pleasure when using it. Consequently, we think perceived enjoyment will advance their intention to use the technology.

H_{12}. Perceived enjoyment is positively associated with their intention to use the technology.

Concentration is one of the important elements in the flow experience. They concentrate on their activities (Koufaris, 2002; Novak et al., 2000). They will not obtain the flow experience, if users do tasks and cannot concentrate in a technology. On the contrary, users focus their attention on the technology degree which will positively enhance their intention to use the technology. Thus, it was presume that:

H_{13}. Concentration is positively associated with their intention to use the technology.

According to those hypotheses, the model structure is shown in Figure 1.

METHODOLOGY

We collected data from teachers and users who manipulated the VR system in education. The group's detailed information and used tools are as follows:

Sample and procedure

87 teachers were asked to collect data from southern Taiwan. VR system is made by EON Studio. EON Studio is software which writes specially on a VR system. This experimental period is a semester for teachers to use a system in class and to know how to use a VR system. Our questionnaires adopted a five-point Likert-type scale from 1 “intensely disagree” to 5 “ intensely agree” was

Table 1. Demographic information of the sample.

Variable	Items	Number (N)	Percent (%)
Degree	Bachelor	67	78.82
	Master	16	18.82
	Doctor	2	2.35
Marital	Yes	14	16.47
	No	71	83.53
Educational background	Information	63	74.12
	Education	15	17.65
	science and engineering	4	4.71
	Business Administration	3	3.53
Online of times in week	1 to 3 h	5	5.88
	4 to 6 h	2	2.35
	7 to 9 h	5	5.88
	10 to 12 h	7	8.24
	Above 12 h	66	77.65
If you are used to IT tools in classroom	Yes	77	90.59
	No	8	9.41
Years of teaching	Below 1 year	65	76.47
	1 to 4 years	0	0
	4 to 7 years	8	9.41
	7 to 10 years	4	4.71
	Above 10 years	8	9.41
Total		85	100

used to answer the questions. Table 1 has some detailed information about teachers, such as degree, marital status, educational background, number of times online, etc.

Instrumentation

Partial least squares (PLS) is a constant tool to verify the validity of the constructs, and valuation of the structural relationship among constructs in latent variables analysis (Chin, 1998a; Gefen et al., 2000). PLS is preferably suited when the concentrate is on theory evolution and it is preferred for examining of a model to analyze data (Gefen et al., 2000). This paper proposed a model which is the most suitable to adopt PLS to measure the constructs about their relationships by multiple manifest variables.

RESULTS AND DISCUSSION

This research used the second-order confirmatory factors analysis of SEM for statistic measurement model to measure the reliability and construct validity of the measurement model and to analyze the relationship between its constructs, as seen in Figure 2.

Measurement model

Fornell and Larcker (1981) suggested that a good convergent validity needs all options loading values which are more than 0.5. We found out that the loading values range from 0.6089 to 0.9954, so they are all greater than 0.5. The result is shown in Appendix 1.

Nunnally (1978) suggested that the Cronbach's α values' range from 0.7 to 0.98 was determined by high reliability and the composite reliability values needed from 0.79 to 0.95. Our data is consistent with the conditions. We found all Cronbach's α values range from 0.744962 to 0.86768, and composite reliability values range from 0919159 to 0.836243. Therefore, this model has high reliability. The result is shown in Table 2.

Fornell and Larcker (1981) suggested that a good convergent validity must be greater than 0.5 and it has discriminate validity that average variance extracted-(AVE) must be greater 0.5. We found all convergent validity range from 0.7461 to 0.9954 in Table 3 and AVE values range from 0.636999 to 0.847802 in Table 2. Therefore, those values play by the rules. This test

Table 2. Summary of measurement scales.

Construct	Composite reliability	AVE	Cronbach alpha
PEU	0.917457	0.847802	0.834054
PU	0.897954	0.746165	0.828044
AT	0.908924	0.76889	0.847575
IU	0.902659	0.756491	0.83406
SC	0.836243	0.636999	0.818028
IA	0.887544	0.725006	0.810672
PE	0.919159	0.791262	0.86768
CC	0.859209	0.670534	0.744962
PR	0.910117	0.83531	0.811269
CG	0.905637	0.827995	0.807364
EX	0.858781	0.756263	0.754362
IN	0.88664	0.798751	0.833845
Construct	**Composite reliability**	**AVE**	**Cronbach alpha**
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examines item correlations, concerned the measures of two construct (Grant, 1989). The diagonals values are the average variance extracted and the other values are the square of the correlations are shown in Table 4. The average variance extracted values implies that each construct should be bigger than the discrimination values of the correlations. Therefore, those values also play by the rules.

Structural model

As shown in Table 5, it is seen that teachers are willing to use VR system in courses, and both individual factors (Motivator factors such as individual attitude and challenging goals) and external factors (Hygiene factors such as reward and competition) can improve the teachers' willingness to use it. However, the p value of PU to Intentions to use (IU) is greater than 0.1, so it is not significant. PU is influenced by many factors, like subjective norm and expectancy (Vasileio and Anastasio, 2011). It means teachers do not believe that VR system is not better than traditional teaching, and not all teachers volunteer to use VR system, so the hypothesis leads to no significance. The structure pattern analysis of the model is shown on Figure 2.

Conclusions

The current research has successfully explored the willingness of teachers to adapt to VR system of teaching based on the enhanced acceptance model. We made verification that this model can be supported. We have some observations that the grand potentials of VR in education and the interfaces can stimulate in-depth the simultaneous virtual 3D place and auditory of learners. Students have better accomplishments when VR system is used in a course by teachers.

Firstly, teachers use VR system to teach what is acceptable. VR has been highly attended about the possibilities of teaching in education. Teaching and learning are increased when studying in VR worlds. Teaching in VR system have positive effects including improving motivation and assisting with social interactions, and had sense like staying in the virtual environment in VR worlds (Dede et al., 2005; Kirriemuir and McFarlane, 2004; Prensky, 2006).

Table 3. The structure of the convergent validity.

Factors structure matrix of loadings and cross-loadings								
Scale Item	**PEU**	**PU**	**AT**	**IU**	**EX**	**IN**	**PE**	**CC**
PEU1	0.8859	0.5939	0.6583	0.6503	0.6337	0.6773	0.6403	0.719
PEU2	0.9756	0.616	0.7571	0.6631	0.6816	0.7197	0.6651	0.6526
PU1	0.4315	0.8164	0.5486	0.6116	0.5553	0.6538	0.6005	0.6197
PU2	0.6173	0.8935	0.6465	0.6563	0.5547	0.6436	0.6548	0.6734
PU3	0.6232	0.9098	0.6476	0.6749	0.5854	0.6928	0.6919	0.6935
AT1	0.6842	0.5935	0.8793	0.7514	0.6047	0.6512	0.7193	0.6642
AT2	0.6825	0.6157	0.8993	0.7568	0.7141	0.7136	0.7542	0.6746
AT3	0.6704	0.6674	0.8836	0.7283	0.7161	0.7236	0.7915	0.6698
IU1	0.4962	0.6026	0.6202	0.7899	0.5322	0.5923	0.6246	0.6757
IU2	0.6489	0.6668	0.7733	0.9229	0.6163	0.7037	0.7536	0.7129
IU3	0.6836	0.6854	0.8119	0.9213	0.6547	0.7498	0.7764	0.6748
PR	0.6829	0.6113	0.752	0.6655	0.984	0.7863	0.7213	0.6837
SC	0.5612	0.5699	0.5721	0.5429	0.7461	0.6129	0.538	0.5271
IA	0.7444	0.7497	0.7777	0.7572	0.794	0.9954	0.817	0.7491
CG	0.5788	0.6248	0.6398	0.727	0.6659	0.788	0.6516	0.5631
PE1	0.67	0.7419	0.7789	0.6985	0.7225	0.7801	0.8956	0.7082
PE2	0.5869	0.6633	0.7855	0.8004	0.6425	0.7706	0.9174	0.7424
PE3	0.6239	0.5997	0.7317	0.7102	0.6094	0.6625	0.8873	0.6957
CC1	0.7345	0.7342	0.7365	0.7579	0.7096	0.7868	0.7567	0.853
CC2	0.4604	0.5714	0.5758	0.5564	0.4498	0.4855	0.5898	0.8241
CC3	0.5304	0.5425	0.5249	0.5825	0.5213	0.5239	0.5963	0.8083

Table 4. Discriminant and convergent validity of the constructs.

-	**PEU**	**PU**	**AT**	**IU**	**EX**	**IN**	**PE**	**CC**
PEU	0.921							
PU	-0.644	0.864						
AT	-0.765	0.705	0.877					
IU	-0.698	0.741	0.84	0.870				
EX	-0.704	0.645	0.765	0.685	0.870			
IN	-0.746	0.757	0.785	0.778	0.803	0.894		
PE	-0.695	0.744	0.851	0.819	0.731	0.821	0.890	
CC	-0.716	0.758	0.754	0.78	0.697	0.749	0.795	0.819
-	Con_0	Con_1	Con_2	Con_3	Con_4	Con_5	Con_6	
Con_0	0.888121							
Con_1	0.742	0.872773						
Con_2	0.755	0.606	0.884836					
Con_3	0.811	0.727	0.826	0.913202				
Con_4	0.816	0.707	0.73	-0.801	0.881432			
Con_5	0.834	0.696	0.697	-0.791	-0.835	0.868442		
Con_6	0.801	0.785	0.716	-0.808	-0.782	0.837	0.862962	
Con_7	0.795	0.732	0.77	-0.837	-0.861	0.861	0.842	0.884174

Secondly, the degree of perceived enjoyment and concentration can impact the acceptance about teachers who use VR system. Koufaris (2002) found out that product involvement, web skills and challenge are relatively correlated, and it could influence consumer intention to return to the shopping website.

Thirdly, internal and external factors can increase the acceptance about teachers' intent to use VR system. Some

Table 5. Hypothesis testing result.

Hypotheses	Path	Path coefficient	P-value	Result
H_1	PEU->PU	0.6444	0.0001***	Supported
H_2	PEU->AT	0.310	0.0024***	Supported
H_3	PU->AT	0.179	0.0169**	Supported
H_4	PU->IU	0.156	0.1145	Not supported
H_5	AT->IU	0.424	0.0001***	Supported
H_6	IN->AT	0.201	0.0576*	Supported
H_7	IN->PE	0.660	0.0001***	Supported
H_8	IN->CC	0.532	0.0002***	Supported
H_9	EX->AT	0.270	0.0001***	Supported
H_{10}	EX->CC	0.269	0.0622*	Supported
H_{11}	EX->PE	0.201	0.0911*	Supported
H_{12}	PE->IU	0.194	0.0469**	Supported
H_{13}	CC->IU	0.187	0.0588*	Supported

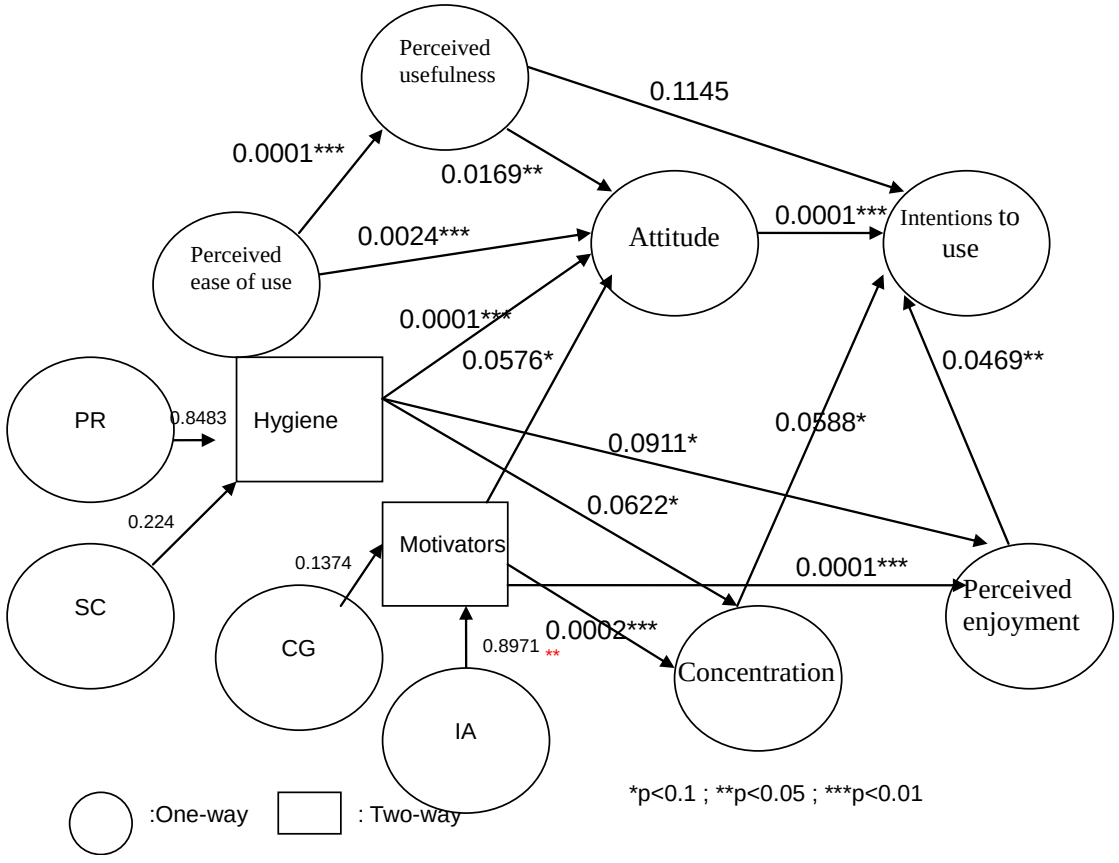

Figure 2. Structure pattern analysis of the model.

researches have started investigating the effect education by using VR and the results present increased learning. A lot of studies have shown increases in scientific exploration skills, concentrated, and intrinsic motivation (Dede, 2009; Dede et al., 2005; Dede and Ketelhut, 2003) The social cognitive theory point those factors of individual, behavior, and environment are influenced by each other (Linnenbrink and Pintrich, 2002). Thus, the teaching can motivate students to learning, because motivation depends on the position

and setting (Linnenbrink and Pintrich, 2002).

In the future, we can do some researches from two objectives. Firstly, the adoption of the traditional teaching methods and the VR system of teaching which can be used to compare students' learning and age range. Secondly, what are those factors influencing PEU and PU in using VR system?

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APPENDIX

Appendix 1. Mean, standard deviation, loading and residual.

Construct	Indicator	Mean	Standard deviation	Loading	Residual	Weight
PUE		3.647059	0.789544	0.91965	0.15225	0.53615
	PUE1	3.623529	0.78644	0.8753	0.2338	0.3804
	PUE2	3.670588	0.792648	0.964	0.0707	0.6919
PU		3.529412	0.824179	0.862867	0.253833	0.384767
	PU1	3.411765	0.835152	0.8067	0.3492	0.3382
	PU2	3.541176	0.852907	0.8829	0.2205	0.4053
	PU3	3.635294	0.784478	0.899	0.1918	0.4108
AT		3.77647	0.794507	0.8768	0.2311	0.3801
	AT1	3.588235	0.806139	0.8688	0.2452	0.3717
	AT2	3.835294	0.737548	0.8886	0.2103	0.3867
	AT3	3.905882	0.839835	0.873	0.2378	0.3819
IU		3.701961	0.832631	0.867567	0.2435	0.382033
	IU1	3.447059	0.866106	0.7805	0.3907	0.339
	IU2	3.717647	0.839668	0.9119	0.1685	0.3989
	IU3	3.941176	0.792118	0.9103	0.1713	0.4082
EX		3.654902	0.746541	0.8609	0.24375	0.53615
	PR	3.811765	0.715377	0.984	0.0318	0.8483
	PR1	3.8	0.783764	0.9521	0.0936	0.6654
	PR2	3.835294	0.737548	0.8742	0.2358	0.4192
	SC	3.498039	0.777704	0.7378	0.4557	0.224
	SC1	3.458824	0.880381	0.8032	0.3549	0.4197
	SC2	3.694118	0.802133	0.9461	0.1048	0.7989
	SC3	3.407843	0.9363	0.6089	0.6293	-0.1527
IN		3.696079	0.732356	0.88715	0.20125	0.51725
	IA	3.833333	0.672593	0.9954	0.0092	0.8971
	IA1	3.894118	0.802133	0.8016	0.3575	0.3349
	IA2	3.752941	0.843827	0.8983	0.193	0.4316
	IA3	3.844118	0.771494	0.8518	0.2745	0.4036
	CG	3.558824	0.792118	0.7789	0.3933	0.1374
	CG1	3.6	0.875595	0.8575	0.2646	0.3833
	CG2	3.52549	0.833137	0.9595	0.0794	0.6996
PE		3.737255	0.813556	0.889433	0.208767	0.374533
	PE1	3.694118	0.77188	0.885	0.2168	0.3776
	PE2	3.729412	0.836493	0.9065	0.1782	0.3963
	PE3	3.788235	0.832296	0.8768	0.2313	0.3497
CC		3.494118	0.768879	0.8186	0.329567	0.4058
	CC1	3.376471	0.912564	0.8428	0.2897	0.5062
	CC2	3.435294	0.68046	0.8143	0.3369	0.3429
	CC3	3.670588	0.713613	0.7987	0.3621	0.3683
Construct	**Indicator**	**Mean**	**Standard deviation**	**Loading**	**Residual**	**Weight**
PUE		3.647059	0.789544	0.91965	0.15225	0.53615
	PUE1	3.623529	0.78644	0.8753	0.2338	0.3804

Appendix 1. Contd.

	PUE2	3.670588	0.792648	0.964	0.0707	0.6919
PU		3.529412	0.824179	0.862867	0.253833	0.384767
	PU1	3.411765	0.835152	0.8067	0.3492	0.3382
	PU2	3.541176	0.852907	0.8829	0.2205	0.4053
	PU3	3.635294	0.784478	0.899	0.1918	0.4108
AT		3.77647	0.794507	0.8768	0.2311	0.3801
	AT1	3.588235	0.806139	0.8688	0.2452	0.3717
	AT2	3.835294	0.737548	0.8886	0.2103	0.3867
	AT3	3.905882	0.839835	0.873	0.2378	0.3819
IU		3.701961	0.832631	0.867567	0.2435	0.382033
	IU1	3.447059	0.866106	0.7805	0.3907	0.339
	IU2	3.717647	0.839668	0.9119	0.1685	0.3989
	IU3	3.941176	0.792118	0.9103	0.1713	0.4082
EX		3.654902	0.746541	0.8609	0.24375	0.53615
	PR	3.811765	0.715377	0.984	0.0318	0.8483
	PR1	3.8	0.783764	0.9521	0.0936	0.6654
	PR2	3.835294	0.737548	0.8742	0.2358	0.4192
	SC	3.498039	0.777704	0.7378	0.4557	0.224
	SC1	3.458824	0.880381	0.8032	0.3549	0.4197
	SC2	3.694118	0.802133	0.9461	0.1048	0.7989
	SC3	3.407843	0.9363	0.6089	0.6293	-0.1527
IN		3.696079	0.732356	0.88715	0.20125	0.51725
	IA	3.833333	0.672593	0.9954	0.0092	0.8971
	IA1	3.894118	0.802133	0.8016	0.3575	0.3349
	IA2	3.752941	0.843827	0.8983	0.193	0.4316
	IA3	3.844118	0.771494	0.8518	0.2745	0.4036
	CG	3.558824	0.792118	0.7789	0.3933	0.1374
	CG1	3.6	0.875595	0.8575	0.2646	0.3833
	CG2	3.52549	0.833137	0.9595	0.0794	0.6996
PE		3.737255	0.813556	0.889433	0.208767	0.374533
	PE1	3.694118	0.77188	0.885	0.2168	0.3776
	PE2	3.729412	0.836493	0.9065	0.1782	0.3963
	PE3	3.788235	0.832296	0.8768	0.2313	0.3497
CC		3.494118	0.768879	0.8186	0.329567	0.4058
	CC1	3.376471	0.912564	0.8428	0.2897	0.5062
	CC2	3.435294	0.68046	0.8143	0.3369	0.3429
	CC3	3.670588	0.713613	0.7987	0.3621	0.3683

PU, Perceived usefulness; PEU, perceived ease of use; EX, hygiene; IN, motivators; CC, concentration; PE, perceived enjoyment; IU, intentions to use; AT, attitude.