

The Research of Multimedia and Cognitive Learning Theory— Web-based Self-directed Learning

RONG-JYUE FANG¹, HUA-LIN TSAI², CHI-JEN LEE³, YUNG-SHENG CHANG⁴ YU-MEI LIN⁵

¹Chair Professor, Department of Information Management, Southern Taiwan University of Technology, Taiwan

^{2,3}PHD, Department of Industrial Technology Education, National Kaohsiung Normal University, Taiwan

^{4,5}Graduate student, Department of Industrial Technology Education, National Kaohsiung Normal University, Taiwan Taiwan

*No.188, Zhong yi St., Fengshan City, Kaohsiung County 830 Taiwan,

[*kittyhl@gmail.com](mailto:kittyhl@gmail.com)

rx26@mail.stut.edu.tw

mickeylee@mail.loxa.com

pluseme@gmail.com

silvalin@gmail.com

Abstract: □ This research is to comprehend the learning pattern type formed by multimedia and cognitive learning discipline. It not only removes the learning disability but also promotes cognitive learning potency. The goals of this research are as follows: (1) Understand the beneficial factors of multimedia and cognitive learning theory analysed by the artificial neural network theory. (2) Analyse the category and the main trend of multimedia and cognitive learning theory by the artificial neural network theory. (3) Analyse the main learning construction of multimedia and cognitive learning theory by scaffolding instruction. (4) Establish the characteristics and forming veins of multimedia and cognitive learning theory. (5) Develop meter of the style of multimedia and cognitive learning theory.

Keywords: - Multimedia, Cognitive Learning ,Web-based Learning

1. The background and motive of this research

The most important topic of teaching is how to develop adaptive education and build a suitable learning environment. Then teachers give the most suitable teaching to individual student and take more advantage of the student's potential[1].

Therefore, this research is to discuss the auxiliary teaching of multimedia information technology, apply the situation learning theory, and promote the cognitive learning.

1 Important scientific theory basis

1.1 The definition of News design

[1] thought that the news design has contained the principles which include the attention, consciousness and the memory maintain. [2] thought that the news design is to simultaneously give dual attention to the learner intrinsic and the external performance.

1.2 Mayer's information processing pattern

[3] proposed the information processing pattern to stress the network multimedia to understand the information processing courses. According to the three basic ideas of cognitive science theory, developed multimedia study cognition theory[3]. This three basic ideas are:

1 □ The humanity is the dual pipeline transactor[4].

2 □ The humanity is the limited capacity transactor[5].

3 □ The humanity is the knowledge constructs the transactor[6].

1.3 Study style

Regarding the study style, the scholars have the different definitions respectively [1] [8] [9]. By different study methods, individual can receive the cognition, the cordiality, the physiology and the environment and so on. Each kind of factors is comprehensive and the correlation influence.

Hence, the study style presents uniformity or stability.

1.4 Clark's study style theory

In 1995, Clark divided the study style into the visual type[7] [11], the auditory type, the kinesthesia type. They are very easy not to be wholly-absorbed, when they does not have the external stimulation or the motion, listen to the lecture they must make the note.

1.5 Clark's study style measuring tool

In 1995, Clark established "t Vision, Auditory, and Kinesthetic Survey; VAK" which can meet this research need. Therefore, this research adopts it, and also matches information processing theory.

2 The research tendency of multimedia auxiliary cognitive learning theory

The artificial neural network is used massively, has advanced to epoch of the artificial wisdom. [7]thought that the real social network majority is the multiple relational networks.

2.1 Research technique

Utilize questionnaire survey procedure in the national elementary and middle school students to collect material, construct multimedia and set up the cognitive learning related pattern.

2.2 Research procedure

In view of each year's research goal, the research procedures are as follows:

□□First year research implementation flow : After looking at Figure 1, it can induce the model specialized cognitive learning network and the feasible cultivation strategy.

2.3 Qualitative Research

Huang (1998) thought that the qualitative research refers to the social life technology carrying on in the research natural situation.

2.4 Content analytic method

Lies in several key words -

1.Objectivity

- 2.Systematic characteristic
- 3.Quantification
- 4.Narrative
- 5.Obvious

2.5 Interview process analysis

Analyze the item of as follows:

1. Text analysis principle[12]

□1□According to three year related interview content, it can draw up the most main analysis category by interviewing the case. For example next table connotation, according to this principle, what was discovered first by the researcher is some category; When has the different category, then names the most suitable name separate.

□2□When the text concept is redundant with two above classification, by the category which names is classified first it

2. Based on the above principle, it may classify the obtained various categories of the concept to perform the rule explanation[13]

3. Quotation text cryptoprinciple[13]

In summary, may know the influence environment consciousness the factor actually is the environment, the individual, the behavior each other correlation, therefore oneself studies the link in the web-based In the boundary consciousness theory overhead construction, may analyze its category to be supposed for the environment, the individual, the behavior to constitute, like Fig 1 shows.

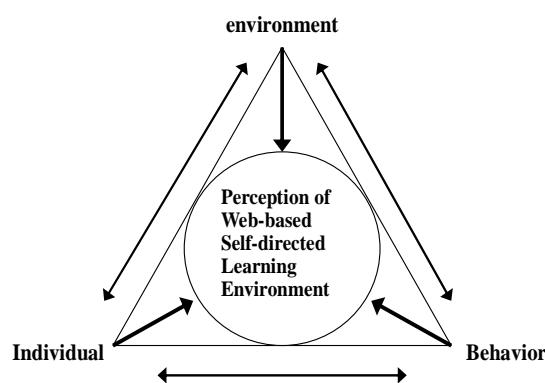


Fig 1. Perception of Web-based Self-directed Learning Environment form factor

This research based on Ban Tula, touches Si's theory, and based on the self- guidance study and the web-based learning environment correlation data, performs three big categories to revise In

order to conform to category of the web-based self-learning environment consciousness theory overhead construction, forms the system environment, the interaction relations and individual development study, like Fig 2 shows .

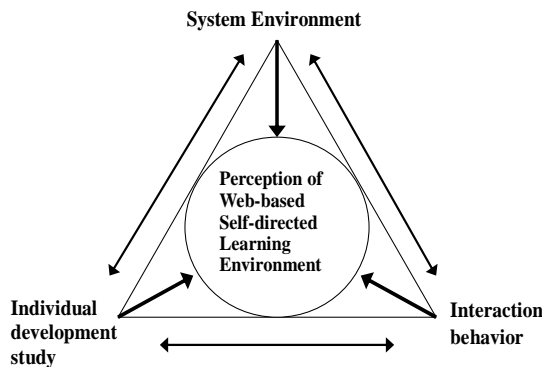


Fig 2. Perception of Web-based Self-directed Learning Environment system categories

3. Interview reliability and validity analysis

The interview and the parsing process all use the triangle measuring method to increase the reliability and the validity, the narration are as follows:

1. Method triangle determination
2. Origin triangle determination
3. Assayer triangle determination

Code reliability analysis: The interview text code's reliability analysis work. Its formula is as follows

□ 1 □ □ P_i □ Mutual agreement

$$\square P_i \square \square \frac{2M}{N_1 + N_2}$$

□ 2 □ □ P □ Equally mutually agreement

$$\square P \square \square \frac{\sum_{i=1}^n P_i}{N}$$

□ 3 □ Code reliability

$$\text{reliabilit} \square \frac{nP}{1 + [(n - 1)P]}$$

3.1 Meets the network analysis survey procedure:

1. The definition of social network

The social network may refer to the network which forms “the relations” because of various types to link, including the blood relationship, the marriage affinity, the market relations, organization's official authority, the hierarchy relations, the unofficial friendship, the partner social relations as well as other type's relations. The relations' set, has formed the social structure, is also one kind of social network (Adler and Kwon, 2002).

2. The analysis method of social network

- (1). (Network Scale, Network Density)
- (2). Cliques and Bridges □
- (3). Actor Centrality :
- (4). Network Roles □

3.2 Empowerment evaluation

From bestows on the power to energize comments, the teacher is as the curriculum comments master.

The teacher is engaged in the curriculum comments the step: Bestows on the power to energize comments viewpoint integration
The following comments include the six steps and the curriculum of the union, and the development.

Step one: Appraisal condition

Step two: Establishment goal

Step three: Development strategy

Step four: The record progress (collection comments material)

Step five: Draws up the countermeasure

Step six: Back coupling circulation

The fore-mentioned five steps are not the sole circulation processes, it is unceasingly the loop check and revises, comments the result in this to use in the curriculum improvement, and enters the second circulation again. This is as follows above six step graphical representation:

3.3 The prospective teacher will be engaged in the curriculum and comment several suggestions

1. Establish the teacher to comment the specialized knowledge energy
2. Comment the target to the curriculum to carry on the significance and the vein process

3. Comment the ability of “studies from operation” to the specialty and the curriculum development
4. The curriculum comments integrates teacher's teaching life: Momentarily may be engaged in comments

3.4 Nine steps

Says approximately, a complete investigation contains many stages (to see also Figure 1), but each stage has its individual principle, it also has the approximate order successively. Therefore, this research various stages will contain the work content which includes as follows:

1. question statement
2. supposition establishment
3. research design
4. survey
5. official inquiry
6. material analysis
7. result analogy
8. practical application
9. confirmation or revision theory

This questionnaire in various domains' education research, will have the huge influence, also provides to our country academic circle's research network has the huge research energy strategy.

Submits a piece of writing for publication the SSCI learned periodical 3 to 4, with international related domain academic academic exchanges.

Attends the overseas academic seminar 2 times, exchanges in front of with the international scholar.

4. Dimensions

Several studies needs the affiliation by several tools, and penetration wired or wireless web-based, takes the answer position teaching material, carries on the on-line or the off-line learning activity. Says regarding the study, the web-based study has provided the study more studies opportunity, therefore the study must first establish the study the interest, and is initiative From the on-line gain information, raises explores and innovates the spirit.

Rests on the above definition, may analyze the web-based resources two mainly to, is aims at

the objective external environment use influence the hardware equipment To, another is easy by the user intrinsic stratification plane use influence resources to use and usefully.

Has this, in web-based function dimensions, the discrimination is two aspects belongs to the bidirectional form, another is the unidirectional form, two Plants the form transmission knows way quite same not less than, the bidirectional form stresses the interaction, the unidirectional form stresses the straight transmission, this two types line web-based tool, needs to look how the user and the teaching to utilize.

Interacts dimensions in the associates, the study penetration web-based platform bidirectional form and the associates carries on knows the share to construct the construction. And can study and the other people Knows does links, in order to a faster conformity more widespread knowledge , provides participates in society the group partner mutually to exchange together, diverse knowledge biography Hands over information which the origin and needs.

In summary, the associates interact face to be possible to differentiate 3 aspects, its one is the team cooperation study, its two crowds of groups discuss carry on the study, its three Forms the web-based study society group, mutually transmits knows with the exchange experience, cooperation study and the group discuss in the traditional teaching the utilization ratio is high But also has divided into the cooperation study form and the group competition form.

The study media condition is refers to the study to accept regarding the web-based learning environment. Although several studies may achieve the not far not session of study, however is new The technical several studies says regarding the study result, has not been able very firmly to be definite can achieve the effective study, because of this correlation to study Regarding several studies

Therefore study media condition dimensions differentiates aspects, is presents the degree and the study take the homepage accepts as the discrimination, the institute By may decide as the study in this stratification plane which the study likes to tend to aspects.

Finally the self- study part, is aims at the study self- guidance study the custom. The self-guidance study viewpoint respectively has the different angle view In any event, its study must personally carry on by study itself, coordinates the oneself intrinsic study wish, the motive and the personality special characteristic, And the external study situation, the study demand and the interpersonal relationship and so on various aspects guidance and the support, take strengthens the self- study the ability and as own study Custom responsible ability.

Receives states, self- study dimensions, should carries on the discussion from the individual as well as the behavior, therefore the discrimination is two big aspects, in individual In aspects, but also may differentiate for the motive as well as the goal, in behavior aspects, also may differentiate the study method with to continue. Therefore oneself Study aspects then formed - the individual - motive, the individual - goal, the behavior - study method, the behavior - has continued, this four aspects.

5 conclusion

An extensive literature review was conducted as the research method. The results include 3 system categories, 5 dimensions, and 13 aspects in the framework. Therefore, the theoretical framework on the perception of web-based self-directed learning environment like Fig 4 shows.

Will study by several carries on the education is the future inevitable development tendency, when study utilization web-based self- study, its environment consciousness to its study Inevitably will have the influence. By way of this research may know the web-based self- study knows theory of overhead construction the environment consciousness, is the humanity uses the science and technology to produce One of study cultures, but the future will utilize several studies the protestantism study condition center, how will the teaching friendly strengthen the study environment of consciousness with, promotes Study study. If can theory of overhead construction by way of this research, then the development following correlation research, even develops to have the letter, effect and Chang Mu meter, believed may and the study has the help to the teaching. Only has properly, the

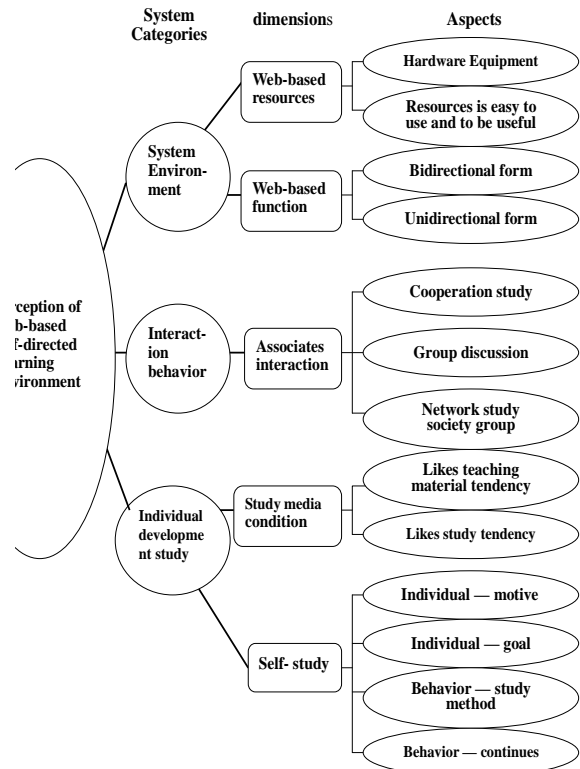


Fig 4 Perception of Web-based Self-directed Learning Environment composition

suitable utilization science and technology facility assists the student the

References:

- [1]Bandura, A. , "Social foundations of thought and action : A social cognitive theory".Englewood Cliffs, NJ: Prentice-Hall, 1986.
- [2]Bonham, L.A. Self-directed orientation toward learning: A learning style. In H.B. Long, & associates (Eds.), Self-directed learning: Emerging theory and practice. Norman, OK: Oklahoma Research Center for Continuing *Professional* and Higher Education, University of Okalahoma, 1989.
- [3]Brockett, R.G. , & Hiemstra, R. Self-direction in adult learning: Perspectives on theory, research, and practice. New York: Routledge, Chapman and Hall, Inc, 1991.
- [4]Chen, Y.S., Kao, T.C., Sheu, J.P., & Chiang, C.Y. A Mobile Scaffolding-Aid-Based Bird -Watching Learning System. Proceedings of IEEE International Workshop on Wireless and Mobile Technologies in Education(WMTE 2002), 2002, 15-22.

- [5]Chou, C.J, & Tsai, C. C. Developing Web-based curricula: Issues and challenges. *Journal of Curriculum Studies*, 34, 2002, 623-636(SSCI).
- [6]Fetterman,D.M.(1994).Steps of Empowerment evaluation:from California to Cape town. *Evaluation and ProgrammingPlanning*,17 (3), 305-313.
- [7]Fetterman,D.M.(1996a). Empowerment evaluation :an instruction to theory and practice.In Fetterman, D.M.,Kaftarian S.J. and Wanderaman, A.Eds, Empowerment evaluation: self- assessment & accountability. U.K.:SAGE
- [8]Fetterman,D.M.(1996b).Conclusion:reflection on emergent themes and next steps.In Fetterman, D.M.,Kaftarian S.J. and Wanderaman,A.Eds,Empowerment evaluation: self- assessment & accountability.U.K.:SAGE
- [9]Gigerenzer, G. (1993). The superego, the ego, and the id in statistical reasoning. In G. Keren & C. Lewis (Eds.), *A handbook for data analysis in the behavioral sciences: Methodological issues* (pp. 311-339). Hillsdale, NJ: Erlbaum.
- [10]Petroski, H. (1994). *Design paradigms: Case studies of error and judgment in engineering*. Cambridge, England: Cambridge University Press.
- [11]Stigler, S. M. (1999). *Statistics on the table: The history of statistical concepts and methods*. Cambridge, MA: Harvard University Press.
- [12]Smith,M.K.(1998).Empowerment evaluation:theoretical and method consideration. *Evaluation and Programming Planning*,21, 255-261.
- [13]Thomas, J. C., & Rosqvist, J. (2003). Introduction: Science in the service of practice. In J. C. Thomas & M. Hersen (Eds.),*Understanding research in clinical and counseling psychology* (pp. 3-27). Mahwah, NJ: Erlbaum.