

A Review: Learner Emotion and Learner Assertiveness in a Personalized Collaborative Learning Environment

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Abstract— This article views Personalized Collaborative Learning (PCL) as an online learning environment. Learner emotion is seen as significant aspect to be taken into consideration in PCL system development whereas learner assertiveness strengthens a learner individual statement. It also views the relationship between learner emotion, and learner assertiveness in discussing Computer Supported Ubiquitous Learning (CSUL) early debate phenomena in a personalized collaborative learning platform. Personalized Learning Environment (PLE), and Computer Supported Collaborative Learning (CSCL) tools like Knowledge Awareness (KA), and Black Box (BB) can be integrated in designing PCL online learning environment. It seems that current personalized learning environment is still evolving. Meanwhile, an in-depth focus should also be given to merge personalized learning environment with collaborative learning environment based on several learners' design aspects division for learning like discussion, location, and milestone.

Index Terms—Black Box (BB), Knowledge Awareness (KA), learner assertiveness, learner emotion, Personalized Collaborative Learning (PCL)

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1 INTRODUCTION

THIS paper focuses on determining whether learner emotion might affect learner assertiveness. And it also searches for findings to answer question like how could learner emotion affect learner assertiveness in a personalized collaborative learning?, hence gathering a critical review of the title scope. To date, the emergence of Personalized Collaborative Learning (PCL) environment can be found in several researches conducted in many fields. Early PCL model samples have been built by Liu et al. [13] in College of Electronics, and Communication, China, El-Bishouty et al. [22, 23] in Department of Information Science, and Intelligent Systems, Japan, Chatti et al. [20, 21] in German for 3P model-driven mashup model, and Cui, and Bull [31] in language learning field.

2 LEARNER ASSERTIVENESS

This review looks beyond cognitive aspects of learners' experiences in e-learning environment because it also focuses deeper into the social, and affective domains of it. Researches that look into learner assertiveness in software engineering are still new due to openness culture that is trending in many Social Networking Sites (SNSs). The thread generation code developed by Jeong [3] is adapted to analyze learner intellectual openness. Learners' messages are classified based on six categories such as:

1. argument (ARG)
2. challenge (BUT)
3. evidence (EVID)
4. exploration (EXPO)
5. explanation (EXPL) [1, 2]
6. answer (ANS)

Learners' total amount of message replies can be counted accordingly, and compared between genders, and courses in terms of openness. A fifth and sixth category that represents learner exploration (EXPO), and learner answer (ANS) shall also be analyzed. It is because, the six categories shall be endured by learners sequently. EXPO may assist learner emerging through vast unlimited resources while still having sufficient time to reflect. On the other hand, ANS is related to final solution for each argument initiation pertaining to learner's tacit knowledge that is found to be relevant to suit his/her needs. Jeong's [3] study finds depth of intellectual openness between male genders is higher than female learners in debate. A research on the differences between introvert, and extrovert learners has shown that introvert learners are more assertive when an argument is prompted in the initial discussion [8, 17]. Besides Jeong's [3] four intellectual openness thread code generation, and new ones (EXPO, and ANS) can be adapted in classifying learner assertiveness three sub-constructs which comprises of:

1. intellectual openness
2. social openness
3. emotional openness

In addition, James [12] in his book "Being Confident: Tips, and Techniques to Help You Unlock Your Potential" states that learner assertiveness means certain actions that ensure diplomatic attitudes among two stakeholders that

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refers to three significant words like rejection, right, honesty. She means that a person must be able to decline another person's request, voicing his/her own rights, and be able to be honest in any situation [12]. It could also mean that he/she at the same time must also respect the other person's right to be fairer. This characteristic is very essential in a learning or workplace communication since it could lead to a balanced profile development. Several characteristics that represent assertive traits listed by James [12] can be mapped with Jeong's [3] learner assertiveness thread code generation, and the three learner assertiveness sub-constructs because they are inter-related among each other (refer Table 1) as follows:

TABLE 1. LEARNER ASSERTIVENESS MAPPING

Learner Assertiveness	Categories	Thread Code Generation
Intellectual	<ul style="list-style-type: none"> - Being able to project fairness between oneself, and the significant other in terms of voicing one's right - Being precise, and clear in making an opinion - Rational in decision making - Being professional which means a person investigate an issue first before concluding it - Being able to discuss an issue, and create a win-win situation - Producing innovative invention to solve a problem 	<ul style="list-style-type: none"> - challenge - argument - evidence - exploration - challenge - evidence
Social	<ul style="list-style-type: none"> - Practical - Thoughtful consideration when being honest - Give space between listening, and speaking in a communication - Confident in terms of personality, as well as attire 	<ul style="list-style-type: none"> - answer - exploration - exploration - evidence - explanation

	<ul style="list-style-type: none"> - Speak clearly, and being able to not to brag to save time in finishing a task - Being able to stand up for oneself when being questioned 	<ul style="list-style-type: none"> - challenge
Emotional	<ul style="list-style-type: none"> - Being able to become emphatic to others' feelings - Feeling relaxed in a situation - Being able to control negative emotions - Showing loving attitude to others - Showing emotional reaction when being hurt - Isolating oneself to keep calm 	<ul style="list-style-type: none"> - challenge - challenge - challenge - evidence - evidence - exploration

3 LEARNER EMOTION

In language learning, humanism theory refers to taking care of learners in all aspects including affective dimension of their performance in a course design. Chitravelu et al. [25] views

"success in learning occurs only if the learning environment is right, and the learners are interested in, and have a positive attitude towards the new information. If these conditions are not there, no method or material is likely to succeed".

In addition, learner must also be given opportunity to develop at their own pace, and convenience as this technique may affect their self-esteem [11, 23, 28]. Jones [30] in his book entitled "Cyber Society: Computer-Mediated Communication, and Community" also support their findings by suggesting that learning must consider:

1. providing enough space or opportunity to reach learner full potential
2. participatory democracy which can be achieved if the teaching, and learning process is not too autocratic
3. culture harmony which is fair to each unique individual
4. privacy, copyright, and ethics consideration with the issue of being real, anonymous or in between
5. reorganizing human's interaction based on several group or creating a new conversation model

Peter, and Urban [6] observes that emotion plays major part in learning, and it can be enhanced using psychological signs measured by affective sensor system to detect emotion classification results like happiness, surprise, fear, boredom et cetera. Peter's, and Urban's research was originally adapted from a budget

experiment by Poh et al. [24] where Poh, and friends had measured learners' emotions from facial expressions by analyzing different face colours of Caucasian, Asian, and African learners by using combination of face tracking results, and blood pressure rates. Pekrun et al. [28] also listed emotions based test named Achievement Emotions Questionnaire (AEQ) that has eight significant feelings in learner, for instance enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom. These emotion types can be aligned with learner assertiveness to gauge how well learners learn in PCL. Learner emotion can be analyzed based on three different categories which consists of class, learning, and test emotion based [28]. It can also be aligned with learner emotion, and/or learner assertiveness which comprises of variety of profiles' types. Krashen's [29] study aligned with earlier findings when he find affective filter hypothesis proposed by Dulay, and Burt [10] fit second language acquisition in terms of higher level of motivation, confidence, good presentation of one's self, and low anxiety encourages learners to perform better in speaking the target language. Learners are humans with mood change, and they may experience different kinds of emotional states in their learning process.

Learner emotion and learner assertiveness are connected to each other pertaining to emotional openness dimension which can be retrieved from learner assertiveness categories in Table 1. It is interesting to investigate the relationship of these two variables in PCL since learner emotion and learner assertiveness plays significant role on learners' rights in its environment. Learner emotion relates to Personalized Learning (PLE) whereas learner assertiveness could be regarded as essential in enhancing interaction quality in current social software application tools. Learner emotion supports learner assertiveness in terms of eliminating confusing statements.

4 PERSONALIZED COLLABORATIVE LEARNING (PCL) ENVIRONMENT

Collaborative learning refers to a group of people who shares same goal, and critically dependent to each other [4, 16]. Curtis, and Lawson [7] also add that in an online environment, collaborative learning focuses on learners' textual interactions instead of face/body language customization settings. Apart from that, collaborative learning helps learners imitating real-life workplace situation where they learn how to present their ideas to others, how to be assertive, how to work as team member, and how to handle projects' challenges [5]. Collaborative learning can also be defined as meeting users' demands in any task completion. And it may refer to interpersonal identity that is possessed by certain learners only as intrapersonal learners might resist participating sincerely because the learning environment does not provide many options to cater for their needs.

Keefe, and Jenkins [15] define PLE as renewal model for the current educational system which pays greater attention on freedom in learning, focuses on creativity of

the learning output, and the learners' needs, and interests. Learners are in charge of their own learning guided by their lecturers to achieve authentic, and reflective learning experiences. Personalized learning also refers to enabling learners to do given task according to their own learning style, convenience, and satisfaction. And it could also means balancing collaborative learning by injecting customized learners' intrapersonal features, and rights.

Liu et al. [13] have suggested a collaborative learning task into personalized learning environment to fit different learning style group. According to Liu et al. [13], it is very difficult to add personalized elements into the current Computer Supported Collaborative Learning (CSCL) online learning environment. Liu et al. [13] observes collaborative learning as supporting dimension to personalized learning since knowledge construction occurs when learners share materials with their peers. Liu et al. [13] has also viewed that a virtual cyberspace named Virtual-U by Simon Fraser University has encouraged its learners to participate for role-play as one example for CSCL applications. However, the lacking includes no consideration on character, learning style, and learning motivation which results to failure for some users [13]. Liu et al. [13] report that they manage to insert personalized elements in their four event sequence generation for group network environment as follows:

1. learning activity initialized: learners, and their roles are set
2. learning resources change: learners, and their current activity sub-goals are changed
3. personalized learning: all learners compete with each other, and learn personally
4. summary: lecturer concludes the whole learning activity

PCL is about providing right, real, and current information at the right time, method, person, and location which means we inspire people in their lifelong learning quest [11, 23]. Inspiration may be inherited from users' two viewpoints such as Awareness (A), and Knowledge Awareness (KA) [23, 26]. A is the state of being alert of others' activities whereas KA is the state of being interested in the use of the activities' knowledge to create new ones [23, 26]. According to El-Bishouty et al., [22], and Jermann et al. [27], KA also refers to visualizing environmental objects space, for instance learner themselves like emotional states, educational, and social materials space, as well as peer helpers' space, and a processing engine which can also be called as Black Box (BB). In addition, El-Bishouty et al. [22, 23] has also conducted few studies on a model of development for personalized collaborative computer support ubiquitous learning environment based on Fischer's, and Konomi's [9] user modelling elements on intelligence learning. According to them, the wealth of knowledge on the Internet may give difficulty to learners in terms of finding the knowledge that suits their problems [23]. Personalized ubiquitous learning environment should support learners "to share knowledge, interact, collaborate, and exchange individual experiences" while still balancing their personal needs [23]. El-Bishouty et

al.'s [23] user model focuses too much on near location, but research on distant location is lacking. They also focus on scientific field that is quite different from language learning [23]. Therefore, new research on PCL in this study focuses on switching the existing model with regards to language learning aspects, and also distant communication. Their research use tagging concept like Radio Frequency Identification (RFID) can be found in almost all mobile gadgets [23]. Their personalized learning model is built based on Computer Supported Ubiquitous Learning (CSUL) main characteristics [23] that comprise of:

1. permanency: learners activities are recorded daily unless eliminated by them freely
2. accessibility: promote self-directed learning, and data can be accessed remotely
3. immediacy: there is no further differences between simultaneous, and delayed conversation anymore as they have been integrated
4. interactivity: experts are available so that knowledge can be shared
5. situating of instructional activities: materials are presented as their own original form

According to El-Bishouty et al.'s [23], it is very troublesome to find friends whom learners can work with either for a short time or long time since this matter might affect their learning quality. El-Bishouty, and friends [23] also describe personalized learning as paying greater attention to users' specific needs in knowledge sharing, as well as their current location, but caters for no video features in their model. This is why we need to refer to personalized learning model as well like Chatti et al.'s [20] 3P Model which refers to Personalization, Participation, and Knowledge-Pull. According to Chatti et al. [20] the three elements can only be achieved if, and only if the learning environment is personal, and self-directed, social, open, emergent, and driven by knowledge-pull. However, Chatti et al.'s iMix personalized learning model displays many tools attachment in its design, hence a system needs to be built to minimize it in terms of scope to fit learner unique learning style, and shall be provided with customization preferences setting or in learner profile itself [21]. Moreover, according to Cui, and Bull [31] who had built a language learning environment called TenseITS, they have focused on individualized aspect for mobile intelligent system as the followings:

1. Learner's knowledge individualization based on learner's current knowledge, problems or misconceptions
2. Learner's location, and learner's location needs individualization: location limitation, and it can also be expanded in terms of contents suitability, interaction patterns, sharing materials quality, response time/duration.
3. Flexibility in terms of portability like handheld computer, but still not neglecting conventional desktop, for instance.

5 PERSONALIZED COLLABORATIVE LEARNING (PCL) REVIEW

Although SNSs, and blog features have already had personalized elements in their platform, it seems like there are something lacking in terms of satisfying users' needs. It is because, when we try to combine collaborative elements, and personalized elements together, we can see that there is a contradictory goal in meeting different users' styles of use. Personalized also means as being intrapersonal, hence some information need to be hidden to ensure that not all output is the same with each other pertaining to competitive reasons, intellectual property security, and privacy. According to Sagan [18], by knowing what learners actually want in their learning may help instructors in designing a learning environment that will produce the desirable results in terms of motivation, achievement, as well as learner participation. She also addresses that each learner's unique styles when tackled with suitable "responsive treatments" increases learners' achievement, attitudes, and behaviours statistically [18].

A time limit shall be given to expose the main idea to avoid discussing or seeing the same output in every discussion. Interactions can still be allowed, but users' including learners shall be given options to participate or not to participate in a task as trust, and security play crucial part in designing an e-learning environment to nurture lifelong learning. Collaborative learning tool may show only active users whom are passive in real-life or persons who shines online. It might also be a reason where a particular user becomes very cruel to perfect learners so that they would give insufficient participation or turn off subscription to those that they dislike online, but in real-life task they need to give contribution since in class there are lecturers who observe, and assess their performance. It is very difficult to judge people online since they might have initiated many characters of themselves online. It is a conflict when people act very different in both worlds. Thus, learner emotion features shall be enhanced in PCL to reduce misunderstanding among learners that may lead to emotional reaction or solitary behaviour.

There are also issues on the immediacy issue, since it is very hard to look upon topic of conversations in current SNSs like Facebook as it is based on recent updates only as some learners prefer to hold the conversation, and when they get back the topic is no longer popular. It means that feedback speed, and duration are different based on learners' response preferences, hence feelings, and response for every learner shall be explained to avoid low answer quality, and misunderstanding. Therefore, when we combine synchronous, and asynchronous communication we must create a balance for both forms to support each learner convenience. Thus, there can be three types of conversation which means synchronous communication, asynchronous communication, and also integrated communication type or even half characteristic of either synchronous communication or asynchronous communication. Apart from that, in terms of interactivity,

the barrier between expert knowledge, and novice learners should be acknowledged or expanded.

A feasible balance of both online learning environments to ensure users' satisfactions need to be created in PCL as collaborative learning model solely is insufficient. However, it is very complex to inject the personalized elements in collaborative learning since collaborative learning is teaching learners how to be social online whereas personalized learning pays attention to their personal choice in using the collaborative learning features. For instance, there is conflict when we try to gather male learners with female learners, active learners with passive learners, matured learners with novice learners, all-rounded learners with potential learners. Competition and argument may occur, but how to ensure all learners are comfortable with the situation, and not running away or lurking to avoid further confrontation, and/or being aggressive by confrontation? It is because, there would be no precise answer in the wealth of knowledge in today's online culture because it is all about how to use the correct information for the right purpose. Learners may eliminate or add their own personal point of view, hence new innovation could happen faster. Learning process has never stopped until the end of class, and is not limited to current course grade yet it is a term that goes beyond current class situation. These issues might be solved if PCL injects learner assertiveness elements in its environment.

Early phase weaknesses in PCL cannot be avoided when combining both collaborative learning, and personalized learning into one online learning environment. In most recent studies, the term 'learn anytime anywhere' is opposed to Fischer's, and Konomi's [9] five rights when learning online is seen as right information, time, way, individual, and place. The old term, and the latter term seem contradictory to each other since not every learner learn in the same way with their peers. Their intellectual level, social level, emotional

level, and learning style should also be taken into account. Not all learners want to be too famous, and popular since some of them like to be on their own due to active life outside the network learning vice versa. It is because, the issue rooted from either being real or anonymous to avoid hurting people's feelings, and argue against statements that they disagree. The arguments, and debates that normally happen online may change how citizens or learners act. This may change how we administer our nation, as well as how learners learn, and lecturers teach. It will also affect how we do our business, and negotiation. It is all about being safe, and comfortable online.

Besides, their last characteristic of CSUL in El-Bishouty et al.'s [23] model which emphasizes on authenticity refers to instructional activities situation, PCL shall not limit its features with original materials only because there should be gaps among materials that are original, half-original/ half-adapted, clone or even shared materials. It is because, sometimes the mix, and match of other original works could lead to critical thinking if, and only if learners are given ample time to reflect on their learning on their own time, way, convenient peers, and location. Therefore, the elements focus can still be expanded in terms of time since time depends on their response convenience otherwise it would be a burden for lecturers to give comments 24/7 a day, and it would be problematic for learners to wait for their lecturers' answers.

Consequently, apart from notification, and referring, major update on SNSs shall be status elaborating when lecturers are available to give comments. Shall all the answers be given simultaneously until all learners stop asking questions online? Thus, further study that looks beyond the matter shall be investigated to ensure maximum convenience of notification, and referring. The PCL review of this paper is derived from table form as in Table 2.

TABLE 2. PCL RELATED PREVIOUS STUDIES' COMPARISON

Author	Title	Issue	Contents	Results	Future Work
Liu et al. [13]	A Method of Task Generation for Personalized Collaborative Network Learning	Current CSCL tools are not compatible with PLE.	A method for individualized collaborative learning has been found based on main categories, for instance grouping learners based on cognitive level, learning goal, and learning patterns. It has been tested using RealClass application which is ran simultaneously.	This method is effective for collaborative learning when injected with task based learning instruction.	PCL can be applied in learning group environment.
El-Bishouty et al. [22]	PERKAM: Personalized Knowledge Awareness Map for Computer Supported Ubiquitous	The use of ubiquitous computing among learners is unavoidable apart from being attached to their	PERKAM is designed based on PAIIS which stands for permanent, accessible, immediate, interactive, and situational activities are the main characteristics for CSUL. Learners are the main object in PERKAM which takes into account of their knowledge, and near location using	A personalized model has been built to strengthen learners tie with their peers' help. Although learners are	PERKAM can be applied in other learning fields like language learning or

	Learning	desktop. The term learn "anytime, anywhere" is no longer relevant.	RFID.	near to each other, they still need to interact or find help from their peers in near learning distance.	even arts. A video features are lacking and the algorithm that support learner with their peers shall be improvised.
El-Bishouty et al. [23]	A Model of Personalized Collaborative Computer Support Ubiquitous Learning Environment	Learners' difficulties in searching for knowledge during learning process.	This study extends from its previous results [22]. It still views learning anytime anywhere as current knowledge sharing culture. However, it has found that TTWP stands for thing, time, way and person is significant in a knowledge search. All learners are represented by their personal agent using concept of A and KAM. It still focuses for inserting personalized features to learners' current situations, and mobility.	A personalized model has been built based on learners' profiles matrix, educational materials matrix, and environmental objects matrix, as well as formula.	Performance, efficacy and performance of personalized system can be applied in other learning environment, as well as video clips as learning materials.
Chatti et al. [20]	The 3P Learning Model	Written to solve hard-to-figure individualistic approach complexity as opposed to traditional failure of Technology Enhanced Learning (TEL).	3P representing Personalization, Participation and Knowledge Pull is the backbone of this comprehensive personalized learning concept paper. All three elements of 3P are well summarized to further understand the personalization phenomena. Five TEL critical factors that strengthen the 3P cornerstone has also been listed as personal/self-directed, open emergent, social, and knowledge-pull. Mashups has been observed as a division between aggregation simplicity that can be viewed as a matter of drag and drop personalization page and integration which adapt Application Programming Interfaces (API). Mashups is new term that supports Web 2.0 and social software dynamic solidatary or isolation.	An illustration of personalized framework that applies 3P model has been proposed.	Future personalized learning platform that takes into consideration of Web 2.0 social software integration.
Chatti et al. [21]	Model-Driven Mashup Personal Learning Environments	Mashups problems, for example scalability, interoperability, reuse, and automatic service invocation, and mediation are solved. Current mashup creation is troublesome even for	Model-Driven Mashup Development (MDMD) derived from Model-Driven Development (MDD) or Model-Driven Engineering (MDE) has been developed to extend PLE and manage mashups systematically. Steps in MDMD include mashup modeling, mashup transformation /generation, mashup execution, and mashup visualization. PLEF-ext architecture is designed to propose for a more user-friendly mashups which enable them to integrate usable mashups in one application	All tools in one PLEF-ext personalized learning environment platform. PLEF-ext architecture has five main modules such as iSearch, iPull, iAdapt, iMix, and MyStuff which are linked to a	Future PLE shall look deeper into satisfying users'needs by providing specific learning tool applications.

		amateur users.	according to their unique needs. The mashup is derived from components, contents, and learners control.	database.	
Cui, and Bull [31]	Context and learner modelling for the mobile foreign language learner	Supporting mobile learners, as well as different races of English As A Second Language (ESL) learners.	This journal has been used by El-Bishouty et al. [23] in his study to develop a personalized model. It is because, Cui, and Bull [31] has focused on three main characteristics of linking learners knowledge, learners' mobility, and contextual feature for a mobile system application in linguistic field. Time limit also plays important part in Cui's, and Bull's [31] learner modeling system.	Intelligent Tutoring System (ITS) called as TenseITS has been developed to support learners mobility where learners can learn based on their time limit in a particular learning place. Interruption frequency can also be set as from high to low.	Interruption attributes shall be broken down to investigate more of its mobile learning support possibilities. Delayed use of the system, and selection of more additional materials can also be embedded into the interaction feature. It can also be applied for various linguistic topics, and cultures.

6 CONCLUSION

To conclude, this paper reports several previous PCL models initiated by researchers from different field to investigate relationship between learner emotion and learner assertiveness for an online learning environment. The integrated PCL tools are also linked with solution to ensure that learner emotion, and learner assertiveness factors are not neglected. Learner emotion can be seen as complementary dimensions of learner assertiveness where it can be divided into three kinds of openness such as intellectual, social, and emotional. To date, there is still lacking in affective or openness features in PCL researches, hence it is hoped that this paper could bring more insights for other researchers to investigate the matter further in providing a convenient learning space for learners in higher learning institutions. Personalized learning environment scope shall also be expanded to broader area which is more far/distant location or even a combination of near and distant location. In addition, personalized learning term is still considered as new among other learning theories like collaborative learning or CSCL and needs more approaches to prove that it is also significant in enhancing learning performance. The learners' aspects that include task, peer help, matrix, model, architecture, mobility, and time limit could also be integrated into more compact design or even deducted to

smaller parts to investigate more about their impacts on learning performance. Focus on learning and the design of PLE should be in balance between each other to boost learning performance. This is due to test and trial ways to manage a personalized learning environment which could be varied and troublesome among various fields.

REFERENCES

- [1] A. Jeong, A Guide To Analyzing Message-Response Sequences And Group Interaction Patterns, 3rd ed., vol. 26. Computer-Mediated Communication. *Distance Education*, 2005b, pp. 367 - 383.
- [2] A. Jeong, Discussion Analysis Tool. Available from <http://garnet.fsu.edu/~ajeong/DAT>, 2005d, last accessed 30 January 2007.
- [3] A. Jeong, The Effects of Intellectual Openness And Gender on Critical Thinking Processes in Computer-Supported Collaborative Argumentation, 1st ed., vol. 22. *Journal of Distance Education*, 2007, pp. 1 - 18.
- [4] A.L. Brown, The Advancement of Learning, vol. 23. *Educational Researcher*, 1994, pp. 4 - 12.
- [5] C. Haythornthwaite, Facilitating Collaboration in Online Learning. *Journal of Asynchronous Learning Networks*, 1st ed., vol. 10. 2006, pp. 7-24.
- [6] C. Peter and B. Urban, Emotion in Human-Computer Interaction. In J. Dill. (Ed.s). *Expanding The Frontiers of Visual Analytics and Visualization*. Springer-Verlog London Limited , 2012.

[7] D.D. Curtis, and M.J. Lawson, Exploring Collaborative Online Learning, 1st ed., vol. 5. *Journal of Asynchronous Learning Networks*, 2001, pp. 21 - 55.

[8] E.M. Nussbaum, K. Hartley, G. M. Sinatra, R. E. Reynolds, and L. D. Bendixen, Personality Interactions And Scaffolding in On-line Discussions, 1st and 2nd ed., vol. 30. *Journal of Educational Computing Research*, 2003, pp. 113 - 137. In L. Howles, and A. Jeong, *Learning styles And The Design of E-Learning: What The Research Says*. Online Classroom: Ideas for Effective Online Instruction, 2009, pp. 1 - 3.

[9] G. Fischer, and S. Konomi, Innovative Media in Support of Distributed Intelligence And Lifelong Learning. *Proceeding of The International Workshop on Wireless and Mobile Technologies in Education*, IEEE Computer Society: Japan, 2005, pp. 3 - 10.

[10] H. Dulay, and M. Burt, Remarks on Creativity in Language Acquisition. In M. Burt, H. Dulay, and M. Finnochiaro (Eds.), *Viewpoints on English As A Second Language*. New York: Regents, 1977.

[11] J. Dill. (Ed.s), *Expanding The Frontiers of Visual Analytics and Visualization*. Springer-Verlog London Limited , 2012.

[12] J. James, *Being Confident: Tips and Techniques to Help You Unlock Your Potential*. London: Vermilion, 2011.

[13] J. Liu, R. Li, and Q. Zheng, A method of Task Generation for Personalized Collaborative Network Learning, *The 8th International Conference on Computer Supported Cooperative Work in Design Proceedings*, IEEE, 2003, pp. 616 - 621.

[14] J. Tao, T. Tan, and R.W. Picard (Eds.), Affective Computing And Intelligent Interaction. *Proceedings of First International Conference, ACII 2005, LNCS 3784*, Springer: Beijing, China, October 2005, pp. 907-914.

[15] J.W. Keefe, and J.M. Jenkins, Personalized Instruction. *ProQuest Education Journal*, vol. 532. 2005, pp. 9-14.

[16] J.W. Strijbos, P. Kirschner, and R. Martens (Ed.), *What We Know About CSCL: And Implementing It in Higher Education*. Dordrecht: Kluwer, 2004.

[17] L. Howles, and A. Jeong, Learning Styles And The Design of E-Learning: What The Research Says. *Online Classroom: Ideas for Effective Online Instruction*, 2009, pp. 1 - 3.

[18] L.L. Sagan, Students' Choice: Recommendations for Environmental And Instructional Changes in School, 6th ed., vol. 83. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 2010, pp. 217 - 222.

[19] M. Burt, H. Dulay, and M. Finnochiaro (Eds.), *Viewpoints on English As A Second Language*. New York: Regents, 1977.

[20] M.A. Chatti, M. Jarke, and M. Specht, The 3P Learning Model, 4th ed., vol. 13, *Educational Technology & Society*, 2010, pp. 74 - 85.

[21] M.A. Chatti, M. Jarke, M. Specht, U. Schroeder, and D. Dahl, Model-Driven Mashup Personal Learning Environments, 1st ed., vol. 3. *Int. J. Technology Enhanced Learning*, 2011.

[22] M.M. El-Bishouty, H. Ogata, and Y. Yano, PERKAM: Personalized Knowledge Awareness Map for Computer Supported Ubiquitous Learning, 3rd ed., vol. 10. *Educational Technology & Society*, 2007, pp. 122 - 134.

[23] M.M. El-Bishouty, H. Ogata, and Y. Yano, A Model of Personalized Collaborative Computer Supported Ubiquitous Learning Environment, *Proceedings of the 8th International Conference on Advanced Learning Technologies (ICALT08)*, Los Alamitos. IEEE Computer Society: CA. 2008, pp. 97 - 101.

[24] M.Z. Poh, D. J. McDuff, and R. W. Picard, Non-Contact, Automated Cardiac Pulse Measurements Using Video Imaging And Blind Source Separation, 10th ed., vol. 18. *Optic Express*, 2010.

[25] N. Chitavelu, S. Sithamparan, and T. S. Choon, *ELT Methodology: Principles And Practices 2nd Edition*. Shah Alam: Fajar Bakti, 2005.

[26] P. Dourish, and V. Bellotti, Awareness And Coordination in

Shared Workspaces. *Proceedings of Computer Supported Cooperative Work '92*, ACM Press, 1992, pp. 107 - 114.

[27] P. Jermann, A. Solter, and A. Lesgold, Computer Software Support for CSCL, 2004. In J. W. Strijbos, P. Kirschner, and R. Martens (Ed.). *What We Know About CSCL: And Implementing It in Higher Education*. Dordrecht: Kluwer, 2004.

[28] R. Pekrun, T. Goetz, A.C. Frenzel, P. Barchfeld, and R. P. Perry, Measuring Emotions in Students' Learning And Performance: The Achievement Emotions Questionnaire (AEQ), vol. 36. *Contemporary Educational Psychology*, 2011, pp. 36-48.

[29] S.D. Krashen, *Second Language Acquisition and Second Language Learning*. Oxford: Pergamon Press Inc., 1981.

[30] S.G. Jones, *Cyber Society: Computer-Mediated Communication and Community*. California: Sage Publications, Inc., 1995.

[31] Y. Cui, and S. Bull, Context And Learner Modelling for The Mobile Foreign Language Learner, vol. 33. *Elsevier/System*, 2005, pp. 356 - 367.



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