Potential of Computer-Supported Collaborative Learning Application Use in Malaysian Schools

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Abstract: *The evolution of courseware in schools with its various attributes, strengths and limitations are increasing. The situation in Malaysian context is not widely known. Particularly with the government effort in implementing the smart school project, the readiness among school teachers would play important role. This paper focuses on the evolution of courseware in schools in general and discusses its attributes, strengths and limitations. Then, the paper presents the details of the survey on collaborative learning carried out among school teachers. The important issues that will be investigated include. the awareness of CL activities, the awareness of using CSCL applications, the teachers involvement in CSCL application development, the CL main and CL success factors.*

Keywords: *Computer-supported collaborative learning, CSCL, CSCL application.*

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1. Introduction

Many journals either in the field of computer science or education have rigorously discussed the use of Computer In Education (CIE). Some of the researchers from both fields work together to enhance the existing teaching and learning methods and produce suitable courseware. In Malaysia, many researchers from many universities have conducted many studies in CIE. Nevertheless, not many publications highlighted the potential use of Computer-Supported Collaborative Learning (CSCL) application in school. CSCL has been chosen as one of the learning strategies to be implemented in the smart school plan under the Multimedia Super Corridor (MSC) project [20]. This paper presents the evolution of courseware in schools in general and discusses its attributes, strengths and limitations and discusses the CSCL potential. As the second focus, the paper presents the detail of the survey on collaborative learning carried out among school teachers conducted in Malaysia which among others discovers the Collaborative Learning (CL) success factors and problems [14]. The objective of the paper is to examine the CSCL implementation success factors and problems faced by stakeholders involved to the need of CSCL application development and its potential use in schools.

The paper is arranged as follows. Section 2 presents the evolution of courseware use in schools. Section 3 describes the survey on CL among school teachers in Malaysia. Section 4 discusses and analyses the findings of the survey. Finally, section 5 concludes the paper.

2. The Evolution of Courseware Used in Schools

Learning activities are growing from print-based generation to image-based world. This new world of learning started with the use of computer application in school from drill and practice [4, 23] which is called Computer-Aided Instruction (CAI) to self-pace learning. Although, the use of CAI is not subject to fatigue as human kind, the system is plain and monotonous kind of application. It does not support the associative nature of the human mind and the referential branching is little, slow and inconvenient. It only concentrates on individual learning and disregards the students' social context [17]. The multi type of medium used in computer application for learning has led to the development of multimedia (MM) application [11, 12]. This application is discovered with the concern that children are more interested to learn in fun environment making use of sound and pictures. The use of MM for supporting classroom instructions, if used correctly can bring breadth and depth to the subject, render efficient use of class time, create flexibility in teaching, and enhance student's learning [19]. The implementation of MM not only gives benefits to students but also allows teachers to create or modify the content such as in CHEMMAT, CHEMistry with MM enhancement and an Assistant to Teachers [23].

Hypertexts (H) systems then emerged imitating real textbooks that are normally used in real classroom. It brings to light the easy to use Computer-Mediated Learning (CML) method. The development of its user interface which is similar to textbooks makes them learn without much problem. The hypertext system allows the

easy navigation of course content and it has some effect on knowledge construction from declarative knowledge to structural knowledge [16]. Internet introduces a new kind of learning not only scheduled in a classroom. The Internet allows the access to information from all over the world, which makes the students more intelligent in selecting suitable material to solve given problems. Usually this kind of work is done in-group or team of four to seven students. This nature of learning introduces a new concept called cooperative learning. It is also called Collaborative Learning (CL). The concept of CL has been introduced since 1930's and it is rediscovered in 1980's. The computer application to support this kind of learning activities is called Computer-Supported Collaborative Learning (CSCL). The objective of CL method is to encourage a group of students to work together to solve a problem [18]. CL strives to foster teamwork, individual accountability, prompt feedback, high self-expectations and respect of diversity among group members. Besides, it also supports both asynchronous and synchronous learning as shown in problem-based learning Collaborative Multimedia Instructional Toolkit (CoMMIT) [18].

The evolution of courseware application design always takes into consideration good attributes of the former method. This is for the sake of familiarizations that also contribute to the user acceptance. The courseware presented above and its relation to each other is shown in Venn diagram in Figure 1 below. Hypertext gives more flexibility to students while CAI controls students' movement in the system. Most of the attributes in hypertext and CAI are included in the development of MM applications. The network facilities enable sharing of courseware content. The enhancement of the Internet infrastructure enables the MM applications to be used online. However, the limited number of computer in any schools brings about CL. CL, in future, should be able to support previous applications as shown in Figure 1 [15]. Table 1 summarizes the CAI, MM, H, CML and CSCL courseware attributes, strengths and limitations. Next onwards research on CSCL will be the main focus of the paper.

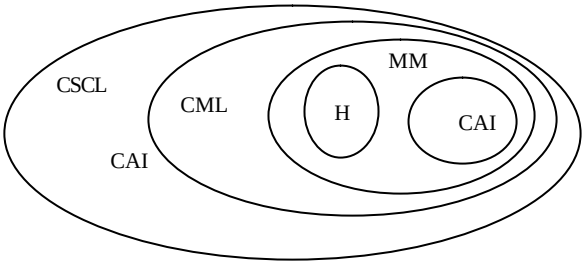

Figure 1. Courseware relation [21].

Table 1. Courseware attributes, strengths and limitations [21].

Courseware	Attributes	Strengths	Limitations
CAI	• Text-based. • Drill and practice. • Support individual learning. • Need instructor and motivator.	• Focus on practice through quizzes.	• Dull interface. • Monotonous. • Does not support the associative nature of human mind. • Little branching.
MM	• Combination of several mediums of sources and instructions. • Interactive. • Tutorials and quizzes. • Multiple sensory channels. • Individual learning. • Need instructor.	• Learning is more interesting. • Less boring because of innovative interface.	• Does not give impact to high scorer. • Need specific hardware and software. • Expensive for individual use.
H, CML	• Non-linear organization of text. • Hypermedia. • Student-centered. • Need guider/adviser. • Knowledge transfer. • Accessible at anywhere and anytime.	• Easy interface. • Natural language. • Allow text searching. • Always available. • Reach a broader customer base. • More people can access at one time. • Self-pace learning and assessment. • Facilitate the processes of remembering, concept formation and understanding.	• Weaker students need some time to learn. • Need infrastructure for Internet connection.
CSCL	• Peer teaching. • Student-centered. • Solving problem based on certain skills. • Teamwork/Collaboration. • Need facilitator.	• Active engagement in learning. • Reach a broader customer base. • Faster to memorize. • Group development skills. • Equalized student interaction pattern. • Less failure. • Lower cost of learning.	• Need Internet connection. • Need some kind of control of participation. • Openness toward location and time.

3. CSCL Applications

Research in CSCL applications is becoming popular after the thriving of research in Computer Supported Cooperative Working (CSCW) theme. Several examples of CSCL applications which have motivated this research are Collaborative Learning And Research Environment (CLARE) [24], Computer-Supported Intentional Learning Environment (CSILE) [21], Collaborative Visualization (CoVis) [7], Knowledge Integrated Environment (KIE) [2] and Learning in Network Community (LiNC) [3, 5].

Most of the above examples are for science learning even though the author of CSILE claimed that it could be used for any subjects. While, the focus of the "What is your decision?" is used to teach about environment, it is still related to science. However, the focus of those applications from the learning perspectives are various. For instance, CSILE and CLARE focused on the knowledge-building using CL. While the efficient usage of net is the focus of KIE, CoVis emphasized on technique of visualization to develop skills of inquiry. From the implementation point of view, some of the applications are of same types. For example, both Belvedere and CSILE are hypermedia systems. Most of these applications encompass CL goals namely learning in group, building knowledge and sharing information. However, in achieving those goals, no single CSCL application emphasized all the cooperation criteria suggested by [13].

A question arises "is the same kind of CSCL application needed in Malaysian schools?". This question however needs further investigation which looks back to the readiness of school teachers in Malaysia in practicing CL in classrooms or laboratories. In conjunction to this, a survey was conducted among school teachers. The survey is expected to reveal the needed CSCL applications which would unwrap many opportunities related to the implementation of CSCL applications.

4. Survey on Collaborative Learning in Malaysia

The objective of the survey is to investigate the current CL practices by school teachers and the CSCL application development.

4.1. Survey Design

The formulation of the questionnaire is based mainly on CL issues and its characteristics which were outlined by Johnson et al [13] and a literature review done related to the area of research. The questions are divided into four parts associated to:

- Background of school and computer facilities.
- CL issues i.e. their experience, success factors for CL implementation and problems that hinder the CL practice in school.
- CL characteristics that should be practiced in school i.e. self-evaluating, face-to-face promotive interaction, social skills development, individual accountability and positive interdependence.
- CL support tools i.e. the features and teachers' willingness to participate.

4.2. Survey Methodology

The questionnaires were distributed to 28 schools in three states namely Negeri Sembilan, Federal Territory and Selangor. The states were chosen because of distance factor while the schools were chosen from the list given by the respective state education office. Each school was given 10-15 sets of questionnaire form. 283 questionnaire forms are analyzed, which is about 84.2% of the total questionnaire forms sent out. This higher rate of response is because of the commitment of the authors sending and collecting most of the questionnaire themselves. The questionnaires were analyzed by calculating the tick mark for questions without rank and total responds scored 3, 4 and 5 for each given question which used rating scale of 1-5, in which 1 represents weak (or low or negative) and 5 represents strong (or high or positive). The coded data were then entered into a data file and analyzed using a statistical package, SPSS for Windows Release 10 [22].

4.3. Survey Results

4.3.1. Background of Respondents

In calculating the percentage in (1), (2), the number of respondents who scored 3 and above, which indicates strong response, is counted.

1. The School Background

There are four types of schools involved in this survey in which three of them are government-sponsored schools, as shown in Table 2. They are religious secondary schools (SMKA), science secondary schools (SMKS) and public secondary schools (SMK). The other school involved is MARA Junior Science College.

Table 2. Type of schools.

Type of Schools	Number of Schools
MARA Junior Science College	2
SMKA	3
SMKS	4
SMK	14

2. The Frequency Usage of Computers in Schools

The respondents were asked six kinds of activity that they do using computer in school. The survey shows

that the usage of computer among teachers is for the preparation of examination paper (87.4%). The easy of cut and paste and editing makes them use text editor application. It is followed with typing lecture notes (72.9%). The usage of computers for learning and teaching is still restricted in for teaching computer literacy. The result shows that teachers are aware of the availability of computers in their schools. It also indicated that computer can be used in teaching and learning. However, the objective to nurture students with higher-order thinking skills is still far.

3. Teachers Awareness of CL Method

Most of the teachers have used or have planned to use CL in their teaching. Only 2.4% of the respondents said that none of the teachers have used CL. While 2.8% of the respondents said that, none of the teachers plan to use CL. These are teachers who have a residual doubt and uncertainty of whether CL is 'acceptable'. This result shows that most of the teachers have heard about CL. In fact, some of them have used CL in their teaching while and those who have not used are planning to use CL.

4. CL in Schools

Overall, most of the respondents (64.7%) agreed that CL should be proposed in school.

4.3.2. CL Practices in Schools

1. Group Activities Practiced

CL can be practiced in many ways and forms [10]. The top three CL activities practiced by teachers are group discussion, group project and group problem solving. Group-problem solving refers to activities in which each group member has to try and use certain strategy to solve given problem. Group project is more likely towards activities which required members of the group to do some research including information gathering, organization, presentation in which each member ensure they meet their deadline by staying in focus. Group discussion is more relaxed compared to the previous activities. Students are free to discuss their own topic by creating their own problem, hypothesis and learn to work in team. Each member could have certain role in the process of generating ideas, responding to others' ideas. Other tasks that they did are group writing and group essay writing.

2. Group Size

The size of group for group project or group activities varies. In informal activities, group size is often kept small (in the range of two to four students) since larger groups have insufficient time to become cohesive. In contrast, a complex semester long project may require the resources of a larger group (four to six students) and there is enough time for the group to become effective. The survey shows that the number of people per group is normally five per group or four per group.

3. Group Forming

Most of the time teacher does the group forming (66.1%) and sometime students do themselves (53.3%). Teacher usually based on academic qualification to perform the grouping (70%) and 8% based on their background. The students usually call their clique to form their own group. This is followed by gender and location.

4. Place of Group Activities

More teachers do their CL activities during class time than out of class time. There are activities that suitable to be done in class or out of class time. Group problem solving is suitable in class time while completing the group project could be done out of the class time. The latter could develop off-task behavior but according to Slavin (1983) using part of the class time for CL produces higher levels of achievement when compared with more traditional technique.

5. Teaching Aid

Teaching aids are tools used by teachers, facilitators, or tutors to help learners improve reading and other skills, illustrate or reinforce a skill, fact, or idea, and relieve anxiety, fears, or boredom, since many teaching aids are like games. Teachers are very familiar with teaching aids in conducting their teaching. Among the teaching aids surveyed, whiteboard is still the main tool used among teachers. Flipchart is the second most used followed by reading text.

6. Group Learning Techniques

Teachers were also asked about CL techniques that they practiced. The respondents gave almost the same to all the techniques listed out. The three highest CL techniques are jigsaw, round robin and think-pair-square. Jigsaw technique would develop listening, engagement and empathy characteristics among students. Each member's contribution is very important to complete the task. On the other hand, think-pair-square is an extension of think-pair-share in which the group member is first paired then discusses certain topic. Then the pair will join another pair to get consensus or conclusion.

7. Duration of Group Activities

CL usually practiced in short period (several days) or longer period (weeks). Most of the activities are done in one-week time and some are less than one week. The next period agreed on is two weeks.

8. Subjects Practiced

The survey shows that CL activities are applied most in English, Malay Language and History subjects.

4.3.3. CL Success Factors

In calculating the percentage in Tables 3-8, responses with 3 and above are counted.

1. Major Hindrances for the Practice of CL in Schools

Respondents were asked to identify major hindrances for the practice of CL in school. Among the major hindrances are given in Table 3.

2. Success Factors for CL Implementation in Schools

Implementation of new techniques or methods of learning usually depends on certain factors for its success. Respondents were asked to identify factors that support the implementation of CL in school. Among the factors that teachers believed to have some contribution towards the success of CL practices are given in Table 4.

3. CL Positive Impacts to Students

Many literature shows that CL gives more good impacts to students than negative impacts. In this survey, teachers were also asked to give their opinion on the impacts of CL to students. CL is seen to engage students actively and lead to achieve the CL objectives. The peers in the group would always motivate, encourage and remind inactive and confused members. It also develops problem-solving skills as they do searching to find solution for the given problem. They would apply all strategies to resolve the problem in the specified time. Teachers agree strongly to all CL positive impacts. The detail impacts are given in Table 5 below.

Table 3. Problem of CL practices.

Problem	%
The nature of CL technique requires quite long period.	85.7
Lack of supportive tool.	84.5
Unable to break students habit.	82.6
Lack of CL training among teachers.	80
Unable to break teachers habit.	77.5
Teachers are not creative.	76.4
Teachers lack of self-confident.	72.3
Difficult to control students in classroom.	71.7
Students' resistance.	71.7
No support and encouragement from peers, mentors and top management.	69.1

Table 4. Success factor of CL practices.

Success Factor	%
Available suitable material for CL activities.	97.5
Involvement of all levels from teacher, students, technical staff and administrator.	96.3
Enough special training on CL to all involved.	95
Enough infrastructures.	93.6
Sufficient technical IT personnel.	92.4
Available computer software to prepare CL activities.	92.1
Available computer software to be used for CL activities.	91.1

Table 5. Impacts of CL activity to students.

Features	%
It engages students actively in the learning process.	98.8
It motivates students.	98.5
It develops problem-solving skills among students.	98
It promotes critical thinking.	97.6
It develops learning communities.	97.5
It increases students' self-esteem.	96.3
It establishes a positive cooperation in school.	94.3
It personalizes larges class.	93.8
It develops social support system for students.	91.7

4.3.4. CSCL Support

1. Category of CSCL Application Needed

Categories of CSCL application that teachers feel should be developed for the usage in classroom are problem-solving and communication skills (98.4%). The next category is categorization skills (97.6%). They also agreed that these applications should employ the five main cooperative elements as suggested by Johnson & Johnson. Teachers preferred an application which would enhance the problem-solving skills among students. It helps to teach students to learn to work in a team which is the reality in their working life. Next, teachers preferred an application that would enhance the communication skill among students. This is very important to interact with other people as we working in group. The third skill is categorization skill which is important to support students in solving any problems given.

2. Impact of CSCL Application Features to Students

Teachers agreed that the features of CSCL application are towards the positive impact of learning explicitly or implicitly. However, CSCL can never replace teachers in classroom or laboratory. Instead, they would take different role in this learning environment.

Table 6. Impact of CSCL application.

Impact	%
It helps students to associate their existing knowledge to learn new thing.	98.8
It makes students understand better.	98.4
It guides students to solve problem.	98.4
It helps students to develop critical inquiry skills.	97.6
It helps students make good decision.	97.6
It helps students to develop scientific argumentation skills.	97.6
It helps students to develop scientific argumentation skills.	97.6
It makes classroom more interesting.	97.2
It helps students to plan together.	96.5
It helps students to develop categorization skills.	96
It helps students to memorize things.	90.9
It can replace teacher when he/she not present.	86.5

4.3.5. Teacher Involvement in CSCL Development

1. Consultation among Teachers for the Development of CSCL

The findings show that 125 teachers or 43.3% agreed to the statement that they have never been consulted by any developers. On the other hand, only 58 respondents or 20.1% agreed to the statement that they

have been consulted by developers while the rest did not give their respond to this question. The findings show a conflicting result to the need to consult user in any tool development process.

2. Teachers Willingness to Involve in Any CSCL Application Development

The survey shows that most teachers are willing to involve in CSCL application development especially in the problem analysis phase. This is similar to the study by [6] which proved that user involvement contributed much to task productivity and user satisfaction during information needs analysis. Teachers are willing to be involved during the analysis phase. The reason and its percentage are as given in Table 7.

3. Participation Technique Preferred by Teachers

Teachers were also asked about the type of participation that they most preferred if they were to be consulted. Group discussion and brainstorming lead the list. The group discussion can be done in a focused way as well as the brainstorming. A facilitator could be used to achieve this goal. The other kinds of participation technique are workshop, observation, survey, meeting, interview and role-playing.

4. Consultation Impacts to Teachers in CSCL Application Development

Teachers were also asked about good impact of their involvement in the CSCL development. The positive impacts are depicted in Table 8 below.

Table 7. Reason why they are involved.

Reason	%
You can adjust the learning techniques in competitive system into CL.	95.3
You know the possible limitation.	95.2
You may ensure that all your needs are included.	94.1
You can include motivation aspect in the CSCL tools.	93.7
They should provide correct and useful information.	93.3
You know the students' attitude very well.	91.7
They know the task involved in teaching, so they can contribute towards CL techniques.	90.5
You are one of the users of the CSCL tools when ready.	88

Table 8. Consultation impacts to teachers.

Positive Effect	%
They will give high commitment.	96.1
CSCL tool will improve their task.	95
They will be satisfied with the CSCL tool.	94.3
Development of CSCL within schedule.	92.7
They will accept the tool.	91.4
They will not reject it.	89.3
They will agree with the developer.	89.3
They will not or unlikely change the requirements.	82.9
They need less or no training.	69.8

5. Discussion of Findings

5.1. Background

As the schools surveyed comprise all types of school available in Malaysia, they are qualified to represent the school teachers in Malaysia. Furthermore, out of 400, the number of teachers returned the questionnaire is about 80%.

5.2. CL Practice

Generally, most teachers are aware of CL method for teaching and learning. Some of them also have practiced it in some forms to some extent. Most of them agreed that CL should be proposed in school. The survey shows that CL activities are most applied in English, Malay language and history subjects. However, they still lack knowledge on how to conduct CL in school. Training and courses are needed to harness the benefits and advantages of CL method. Among the CL activities that should be covered in the training are kinds of activities that can be practiced, preparing the resources to be used in the activities, arrangement of students in the activities, administration of group for the activities and wide ranges of teaching aid to be used. Exposure to some CSCL applications would also enhance their knowledge of CL which lead to the increase of CL practice.

5.3. Hindrances and Success Factors of CL

The hindrances and success factors of CL are classified into task, people, technology and training factors of category [15]. It shows that factors related to technology contribute the highest to CL problems followed by task, training and people. While factors related to task contribute the most to the CL success. It is followed by factors related to training, people and technology.

5.3.1. CL Problems

One of the factors related to technology problems can be seen from the lack of CSCL courseware. Lack of CSCL courseware in the market proved that there is lack of supportive tools in handling CL as found in this survey. Instead, standalone kind of courseware such as multimedia and computer-aided instruction packages are still dominating courseware market. The lack of consultation among school teachers in the development of CSCL courseware could be one of the reasons that contribute to the lack of CSCL. An observation into the impacts of user involvement is carried out. It is found that their involvement impacts more to their need (93.7%) followed by task (93.6%), tool (91.1%) and their behavior (84.5%) [15]. The impact on need will influence on satisfaction of CSCL application among users.

The survey shows that most teachers are willing to be involved in any courseware development. The most preferred approach is focus group discussion (93.8%). They are willing to be involved in the problems analysis phase since they are familiar with learning

activities environment. This is true as teachers are one of the knowledge experts in the domain of learning and teaching. The use of preferred technique would provide a comfortable condition to them would highlight correct need. For instance, the category of CSCL courseware that most of the teachers surveyed wanted is category that will improve problem-solving and communication skills.

The other categories of problems are quite equivalent in its percentage namely task-aspect (78.7%), training (76.2%) and people (75.2%). Task category of problems is associated with the perception of the nature of CL practice. Most teachers look CL as requires quite long period. Teachers see this as not practical in two-session schooling system which is implemented in most schools in Malaysia. Though, the suggestion of one-session schooling would reduce this problem, the development of CSCL courseware would lessen this problem sooner as some of the work such as the preparation of material will be assisted by the computer.

Training category of problems showed that there is lack of teachers trained in CL activities. As a result, most of them are less confident in handling CL. As far as CL is concern, it needs some creativity in the preparing of CL material that will be used in the activity. CL training should be arranged to all teachers from time to time. The training of teachers and selection of correct software will make a bigger difference [1]. Finally, the people-aspect problems focused on the participation of students, teachers and the top management.

Nevertheless, the most important issue is to change the habits among students and teachers. Students need to change their role from passive recipient to more active participant. On the other hand, teachers have now become as a facilitator.

5.3.2. CL Success Factors

The highest success factors about CL activities are towards task category. Teachers recognized CL activities as difficult and they need suitable materials to conduct it. They should pose high self-imagination and creativity [10] in preparing those materials. Teachers also see this activity as time consuming not only in the preparation of the materials to be used in the activity but also in performing the activity itself. Therefore, identification of suitable materials is needed whether it is computer-supported or not. Certainly, it would reduce time in CL preparation thus CL is handled without affecting the tight schedules of two-sessions schooling systems used in most schools in Malaysia.

This identification of suitable material is very much related to users and their needs. However, computer- or technology-related materials are yet to be the teachers' option. The finding shows that technology-aspect scored the lowest of success factors examined. Among the factors considered are enough infrastructures, available CSCL application to prepare CL activities and available CSCL application to be used for CL activities. The availability of suitable material for CL alone would not insure the successful of CL practice. Enough CL training and well-trained people are also important. The second and third success factors aspects are training (95%) and people (94.4%) respectively. The training-aspect success factors are to ensure that all involved in CL should have certain level of CL knowledge. Besides, all levels of people in schooling systems should know and participate in which sufficient IT technical personnel is greatly desirable for the success of CL.

5.4. CSCL Development

Lack of user involvement and the need of CSCL application will be discussed further in this section.

5.4.1. Lack of User Involvement

The findings show that not many of them are fortunate to involve in such activity. Teachers surveyed are very keen to involve in the CSCL application development. They know when and how they will give their best input for the systems. Their awareness would show positive impacts for the development of CSCL application. The survey shows that only one fifth of the teachers surveyed have some experience being consulted by courseware developers. Majority of teachers are still not exposed to CL suitable materials. The lackings might exhibit some disadvantages such as rejection to the applications and give low commitment for CL implementation.

In relation to this, user involvement would provide teachers with some kind of channel to express their proposal which may include good ideas. A lot of ideas are good especially during the problems analysis phase. They believed that they can contribute to artifacts for this purpose since they are the direct persons in contact with students and have affluent knowledge to this task. Their involvement would ensure positive impacts to the development of CSCL courseware. The involvement can be carried out in many ways like be a member of group discussion, be a respondent of questionnaire survey, be an interviewee in face-to-face interview or be a member in CSCL workshops. The lack of user involvement issue becomes worst as most schools are still in lack of teachers trained in CL activities and this lacking limits the CL activities in schools.

5.4.2. The Need of CSCL Applications

The awareness of CL activities among teachers is quite good in this survey. Teachers agree that CL is suitable for all subjects in problem-solving skills type.

However, the use of CSCL tool in handling CL is still low. The survey findings show that they still prefer to use white board and marker pen compared to Internet and courseware. The use of computer in schools is mainly to prepare examination paper.

They agreed that the CSCL tool would improve their task. It is true that this tool would not replace teachers but it assists teachers in preparing material to be used in classroom. The use of computer should be extended to other scope in learning and teaching activities. In many situations CSCL applications would ease the teachers task in handling the teaching process. Furthermore, CSCL would facilitate teachers to monitor the students engaged in CL activities.

6. Conclusion

The evolution of courseware in schools in general and discussion on its attributes, strengths and limitations are presented in the paper. The paper then presented the survey on collaborative learning among school teachers conducted in Malaysia. Among the important points highlighted are:

- The use of CSCL applications would enhance CL activities.
- The awareness of using CSCL applications among teachers is still low.
- The number of teachers involved in CSCL application development is very low.
- Most schools are still lacking of teachers trained in CL activities.
- The CL main problems and success factors are related to technology factors and to task factors respectively.

In summary, to eliminate views that CL method is difficult among teachers, CSCL-related support tools need to be developed. In the development of these tools, user involvement is important to ensure their needs are considered. It would also enhance the awareness among them and would be the basis for training in CL activities. Like other courseware; CAI, MM, CSL and CML, the use of CSCL is believed to enhance the learning process in school and is for the benefit of students and teachers. It will not substitute teachers but its emergence has changed their role from the information sources to learning coach or guide.

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