IMPACT OF COLLABORATIVE TOOLS UTILIZATION ON GROUP PERFORMANCE IN UNIVERSITY STUDENTS

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ABSTRACT
Nowadays the growth of technology influences the changes in group collaboration's process either for the professional or for the students. The requirement of interaction in group collaboration while doing task forces the students to schedule their meeting in order to finish the task given. So the technology starts to influence the process of group collaboration as a communication and interaction media between students in doing their tasks. The purpose of this research is to analyze factors from technology characteristics that drive the students to use collaborative tools, and the implication of using collaborative tools in group collaboration to the group performance. Our research model was validated using Structural Equation Modeling (SEM) technique with LISREL 8.8 tool on 196 respondents from undergraduate and postgraduate students of Faculty of Computer Science, Universitas Indonesia. Our findings showed that the ease of use and perceived usefulness of the collaborative tools drive the students to use collaborative tools when doing their tasks. The existence of collaborative learning is also a driving factor for the students to use collaborative tools. In addition, the use of collaborative tools also showed a positive influence to the team performance.

INTRODUCTION

Good quality education is one key to improve the human resource capacity. Data from Human Development Index (HDI) placed Indonesia at rank 121 out of 185 countries in 2013 (United Nations Development Programme, 2013). This shows the level of quality of human resources in Indonesia is still far from the expected. One of the efforts made to improve the human resource is the transformation of education, shifting from teacher-centered learning to student-centered learning. One of the student-centered methods applied in many universities in Indonesia is collaborative learning which requires students to work in group.

Doing the task in group requires an ability to manage and adjust time each other, so they can do the discussion which lead them to solve the problem in the assignment. Process of communication, coordination, and other factors like trust, understanding each other, cohesion, and conflicts will become concerns in a group collaboration that separated by location and time (Naik & Kim, 2010). With the existence of information technology, students will not need to think about how to adjust physical meeting schedule. They can do the discussion even from different location. Information technology tools that support student's collaboration activities to accomplish the task are called collaborative tools (Munkvold, 2003).

There are various collaborative tools available to use. Becker & Cline (2005) showed that collaborative tools type that commonly used in the organizations activities such as videoconferencing (47%), personal communication devices (45%), project management software (33%) and remote dial-up devices (31%). Bajwa & Lewis (2003) also stated various collaborative tools used, among of them were e-mail system, audio teleconferencing, video conferencing, data conferencing, web-based tools, proprietary groupware technology, and electronic meetings system. More than 90% organizations reported that e-mail and audio teleconferencing were available and utilized by employees, but less than 40% organization using nor provide EMS technologies. There were also many attempts to use collaborative tools for learning activities, such as Wiki (Aaltonen & Kallinikos, 2012; Engstrom & Jewett, 2005; Wagner, 2004). The collaborative tool can also be combined with Learning Management Systems (LMS) to enhance the student's ability, for example to improve the programming skills (Cavus & Ibrahim, 2007).

Collaborative tools help group activities by providing ease of communication and coordination among members of the group. Results of previous studies showed a variety of benefits from the use of collaborative tools. Cavanaugh (2001) showed that collaborative tools can be useful to equip, develop, and expand educational options for students. The use of collaborative tools in the group learning also gave a positive impact on cognitive processes and effective results when compared to individual learning (Lou, Abrami, & d'Apollonia, 2001). The use of collaborative tools also proved to improve the quality of social interaction between students and students, and students and teachers. This is caused by the interaction between users are becoming more visible, so as to improve understanding of each other (Ma, 2009). In addition, the use of collaborative tools also allowed for

interactive process, where learners are able to build new knowledge in a social level (Kreijins & Kirschner, 2002).

Although previous researches stating the benefits and popularity of collaborative tools, there were only few researches concerning adoption factors of collaboration tools as well as their impact to group performance. Considering this, our research was conducted to answer the following research questions: (1) what are the technology-related factors that influence students to adopt collaborative tools for their group work? (2) does the use of collaborative tools influence the group performance among students?

This study was conducted at the undergraduate and master's students in the Faculty of Computer Science, Universitas Indonesia. Considering their field in the computer science, they are used to using a variety of information technology tools to assist their activities, so that we considered them as suitable respondents for our study.

COLLABORATIVE LEARNING AND COLLABORATIVE TOOLS

Collaborative learning is an activity that involved a process where a group of students collaborate to accomplish problem solving task given as learning activities requirement (Alavi, Wheeler, & Valacich, 1995). A collaboration involve two peoples or more who interact each other, at certain period, working together to achieve the same goal (Patel, Pettitt, & Wilson, 2012). Collaboration activities in group can be done without physical meetings of its member by using collaborative tools. Collaboration technology is a technology artifact that supports collaboration activities and coordination between related part to achieve certain business and organization goals (Munkvold, 2003). Collaborative tools is usually web-based, it can be accessed by user easily. Web-based tools can support group collaboration activities with no requirement to pay at high price, it just need to use internet access, there is no requirement to have other additional hardware (Dennis, 1996). Some examples of collaborative tools are e-mail, audio conferencing, collaborative presentation software, conference room video-conferencing, desktop video conferencing, discussion database, document management software, electronic whiteboarding, group authoring, GDSS, group scheduling and calendaring, knowledge management systems, one-way bulletin boards (BBS), personal communication tools like laptop, mobile phone, pagers, and so on (Becker & Cline, 2005).

RESEARCH MODEL AND HYPOTHESES

Davis (1989) has explains TAM model that describes technology characteristics that influence people's intention to adopt the use of a technology. TAM model has proved that technology-related factors that influence the intention to use a technology were perceived ease of use (PEOU) and perceived usefulness (PU). Perceived ease of use variable stated a feeling when someone feels easy to use and also operate a system. In this research context we can say PEOU as a feeling when students can operate the collaborative tools easily. On the other hand, perceived usefulness variable stated the feelings when someone belief the performance will improve by using an information system. Collaborative tools are expected to help students to communicate, convey ideas related to the tasks to be completed, as well as manage all documents generated from the group assignments so that progress can be monitored by all members of the group. Perceived ease of use provided by the collaborative tools that can be accessed anytime and anywhere would be expected to affect the perceived usefulness of collaborative tools, so that we outlined our first hypotheses as:

H1: Perceived ease of use of collaborative tools positively influences the perceived usefulness of collaborative tools.

Besides, TAM model also explains the relationship of PEOU and PU variables with intention to use that stated someone's will or intention to use a technology. In this research context, intention to use collaborative tools can be described as a students who can feel the easiness of collaborative tools utilization and understand the usefulness they will got by using collaborative tools to perform group assignment, they will have intention like "If I have access to use collaborative tools, then I will accomplish the group's assignment by using collaborative tools" (Venkatesh & Davis, 2000). Thus, we outlined our second and third hypothesis as:

H2: Perceived ease of use of collaborative tools positively influences students' intention to use collaborative tools in doing group's assignment.
H3: Perceived usefulness of collaborative tools positively influences the students' intention to use collaborative tools in doing group's assignment.

If two hypotheses above are proved, TAM model has further explanation about the positive correlation between students' intention to use collaborative tools and the actual use of collaborative tools. According to TAM theory,

intention to use collaborative tools should be able to predict the actual use. TAM also stated that the actual use of technology is influenced by the ease of use, usefulness, and intention to use a technology (Davis, 1989). In our case, we expect that students who have intention to use collaborative tools in doing their assignment will lead to the actual use of collaborative tools as a media to accomplish their group's assignment. Thus, it leads us to present our hypothesis as follow:

H4: Students' intention to use collaborative tools positively influences the actual use of collaborative tools as supportive tools to complete the group's assignment.

Group discussion and collaboration activities between group's members drive the student to practice their communication skill to others and to think critically (Kreijns, Kirschner, & Jochems, 2003). The importance of collaborative learning activities for students underlies the need of information exchange between group's members. This will be a problem because of the time needed to distribute information, information complexity, and the quality of communication channel. Network and information technology are able to be a solution to produce effective and efficient collaboration activity (Line, 1997). Meanwhile, Munkvold (2003) stated that current collaborative work practices give positive impact to its users and also to collaboration technology. Bratteteig (1998) also showed that collaborative work practices should be there first before knowing the technology. Thus, we stated our fifth hypothesis as follow:

H5: Collaborative learning activities positively influence the actual use of collaborative tools as supportive tools to accomplish group's assignment.

Group's effectiveness defined by the existence of planning and managing meeting schedule, monitor and evaluate performance, and the presence of information exchange between each other (Becker & Cline, 2005). The various features offered by collaborative tools can support and simplify the process that has to be done in a group to do collaboration, so we expect that the use of collaborative tools will be able to improve group's performance.

Some previous research that discuss about the relationship between actual use of technology and group's performance is Majumdar & Krishna (2012) that stated about rapid growth of web 2.0 technology capabilities which positively impacted the interaction in a group. There was also a result from research by Elie-Dit-Cosaque & Pallud (2012) that showed the use of collaboration system positively impacted the performance of collaboration. Thus we expect that the use of collaborative tools will impact to the group performance that yields the following hypothesis:

H6: The use of collaborative tools positively impacts performance of the group that utilizes collaborative tools to complete the assignment.

The complete conceptual model of our research can be seen in Figure 1.

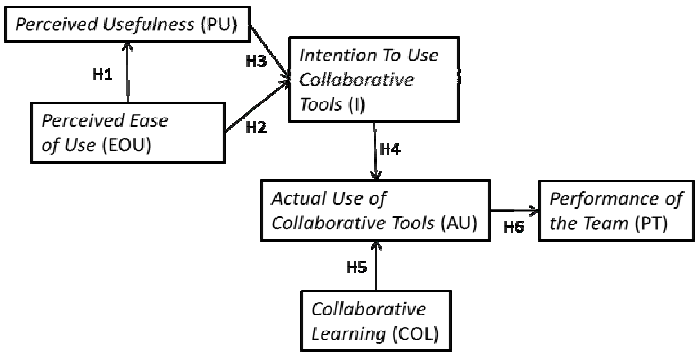

Figure 1: Research Model

Research model shown above is a result of combining TAM model with other variables like collaborative learning, in accordance with the theory that say that collaboration activity will need the use of collaborative tools to support exchanges of information and communication between group's member (Line, 1997). This model also portrays the relationship between the use of collaborative tools and performance of group that use it.

Table 1: Variables and indicators of research instrument

Variable	Indicator	References
Ease of Use (EOU)	EOU1. Learn how to operate collaborative tools feels easy for me.	Legris, Ingham, & Collerette (2003), Davis (1989), Subramanian (1994)
	EOU2. I can use collaborative tools' feature to produce the result I want.	Legris, Ingham, & Collerette (2003), Davis (1989)
	EOU3. I can remember how to do the task with collaborative tools.	Davis (1989), Agarwal & Prasad (1999)
	EOU4. Overall, I can operate the collaborative tools easily.	Davis (1989)
Perceived Usefulness (PU)	PU1. Use of collaborative tools increases my productivity in doing group's task.	Legris, Ingham, & Collerette (2003), Davis (1989), Subramanian (1994)
	PU2. Use of collaborative tools makes the collaborative learning easier.	Davis (1989), Subramanian (1994)
	PU3. Collaborative tools make the collaborative learning process more effective.	Legris, Ingham, & Collerette (2003), Lederer et al. (2000)
	PU4. Use of collaborative tools increases group's performance.	Legris, Ingham, & Collerette (2003), Davis (1989), Lederer et al. (2000)
Intention to use collaborative tools(I)	I1. If I have group task in class, I intent to use collaborative tools to complete it.	Davis (1989), Venkatesh & Davis (2000)
	I2. If I have internet access, I intent to use collaborative tools to accomplish group task.	Dennis (1996), Venkatesh & Davis (2000)
Actual Use (AU)	AU1. I use collaborative tools to discuss and share opinions with group's member, to complete group's task.	Bajwa & Lewis (2003), Lanubile et al. (2010), Kittle & Hicks (2009), Davis (1989), Beal & Rogers (1960)
	AU2. I use collaborative tools to monitor the progress of group's task.	Kittle & Hicks (2009), Davis (1989), Beal & Rogers (1960).
	AU3. Overall, I use collaborative tools to complete group's task.	Davis (1989), Beal & Rogers (1960).
Collaborative Learning (COL)	COL1. I collaborate with friends to finish group task from the lecturer.	Patel, Pettitt, & Wilson (2012)
	COL2. I share informations and knowledges when collaborating with my group.	Singh & Avital (2007)
	COL3. Collaborative activities involve task distribution between group's members.	Singh & Avital (2007)
Performance of the team (PT)	PT1.Collaborative tools utilization helps the process of task schedule planning to become easier.	Becker & Cline (2005), Majumdar & Krishna (2012), Serce et al. (2011), Gress et al. (2010)
	PT2. Collaborative tools utilization make the monitoring of task's progress activities easier.	Becker & Cline (2005), Majumdar & Krishna (2012), Gress et al. (2010)
	PT3. Collaborative tools utilization makes the process of task compilation and task alignment easier.	Nikas, Poulymenakou, & Kriaris (2007), Bajwa & Lewis (2003), Kittle & Hicks (2009)
	PT4. Collaborative tools utilization become the media to share information within group.	Becker & Cline (2005), Gress et al. (2010), Hoegl & Gemuenden (2001)
	PT5. Overall, collaborative tools utilization facilitate me to contribute in completing group task.	Lanubile et al. (2010), Hoegl & Gemuenden (2001).
	PT6. Other group members and I can support each other by using collaborative tools.	Hoegl & Gemuenden (2001)
	PT7. Collaborative tools become communication media to give feedback of task's result between me and group members.	Serce et al. (2011), Hoegl & Gemuenden (2001)

METHODOLOGY

Our research uses quantitative research approach (Creswell, 1994) in order to prove our hypotheses. We used survey method which is conducted to describe specific aspect from a population quantitatively (Kraemer, 1991). Survey is also conducted to obtain generalization of findings resulted from sample population, but with a random error constraints (Bartlett, Kotrlik, & Higgins, 2001). As a case study for our research, we conducted survey to undergraduate and postgraduate students in the Faculty of Computer Science, Universitas Indonesia. The Faculty of Computer Science, as the pioneer institution offering computer science program, offers a set of degree program from bachelor to PhD program in Computer Science and Information Systems. Currently, we have around 1.700 students in all degrees.

Population, Samples and Data Collection Procedures

Population in this study was the bachelor and master students in the Faculty of Computer Science, Universitas Indonesia. We selected students from 2007-2012 classes of bachelor program and from 2011-2012 classes of master program. The population was chosen by considering that the respondents are still actively attending learning activities and doing group tasks. We used convenience sampling to draw samples of our study, which is a technique used to take non-probability samples, where the sample chosen from population is the sample that can access the questionnaire easily, read the post of questionnaire link, and that can be contacted directly (Ross, 2005). We prepared the questionnaire in online and offline mode. We sent the softcopy and link (URL) containing our questionnaire to student mailing lists. We also asked directly to students we met to fulfill the questionnaire. In total, we obtained 196 respondents returning the questionnaire. Number of our respondents has meet the minimum requisite of data to be analyzed with SEM procedures using Maximum Likelihood estimates that need 100-150 samples (Hair et al., 2010).

Instruments

Our questionnaire was divided into two parts. The first contained respondents' profile such as gender, education, classes, and collaborative tools that have been used to complete their group task. Second part was questions which were derived to reflect our latent variables and their indicators. Variable' indicators were obtained from theory and previous research results. Variables and indicators that we used to develop our questionnaire can be seen in Table 1.

RESULTS

Respondent Demographics

Respondent's profile in this paper gained from the results of questionnaire distributed, consist of gender, education, and various collaborative tools that has been utilized. 62% from total respondents are male (122 respondents), and 38% of total respondents are female (74 respondents). For education level, 55% comes from master degree (107 respondents) and 45% from bachelor degree (89 respondents). Meanwhile, base on respondent's answer about what collaborative tools they have used to complete their group task, the distribution of collaborative tools used are: e-mail (182 respondents), Google Drive (163 respondents), instant messaging (160 respondents), Whatsapp, KakaoTalk, and Line (153 respondents), Skype (145 respondents), and Dropbox (121 respondents). Considering the same point of view between author and all respondents (as a student), all collaborative tools mentioned for this research are those that have been used by respondents to complete group task given by faculty. Table 2 summarizes the demographics of respondents in this study.

Table 2: Respondent demographics

Age	%	Collaborative Tools	%
Male	62	Email	93
Female	38	IM	62
		Dropbox	82
		Skype	74
Education Level	**%**	Whatsapp, Kakautalk, Line	78
Bachelor	45	GDrive	83
Master	55	Others	11

Measurement and Structural Model

We processed the collected data by using LISREL. LISREL is a statistical tool that support for covariance based Structural Equation Modeling (SEM). First, we checked classic statistical assumption, which includes the accomplishment of minimum total sample needed, normality test, and multicollinearity test.

Table 3: Results of validity and reliability test

Variable	Indicator	Loading Factors	CR	VE
Ease of Use (EOU)	EOU1	0.77	0.83	0.55
	EOU2	0.64		
	EOU3	0.68		
	EOU4	0.75		
Perceived Usefulness (PU)	PU1	0.76	0.87	0.62
	PU2	0.76		
	PU3	0.77		
	PU4	0.77		
Intention to Use (I)	I1	0.86	0.83	0.72
	I2	0.83		
Actual Use (AU)	AU1	0.70	0.77	0.53
	AU2	0.69		
	AU3	0.71		
Collaborative Learning (COL)	COL1	0.70	0.82	0.60
	COL2	0.78		
	COL3	0.84		
Performance of the Team (PT)	PT1	0.60	0.87	0.49
	PT2	0.73		
	PT3	0.72		
	PT4	0.76		
	PT5	0.56		
	PT6	0.61		
	PT7	0.74		

Next, we tested the model fitness that consists of measurement model test and structural model test. We conducted confirmatory factor analysis (CFA) for measurement model tests that comprise both validity and reliability test. Table 3 presents results of validity and reliability test of our model produced by LISREL. According to (Wijanto, 2008), the minimum value of loading factor is 0.5. Our results showed that all questionnaire items had loading factor value ≥ 0.5, so that we concluded all questionnaire items were valid. Reliability test was performed by using the criterion value of Construct Reliability (CR) and Variance Extracted (VE). Results of reliability test in Table 3 show that the value of CR and VE are already exceeded 0.7 and 0.5 respectively. So that it can be concluded that the model is also reliable. The VE value of Performance of the Team (PT) is 0.49, however this value is close to 0.5 so that we still considered it reliable.

We also tested the model fitness based on Goodness of Fit (GOF) criteria as can be seen in Table 4. We used fitness values recommendation according to (Schermelleh-Engel & Moosbrugger, 2003). The CFA column represents the goodness indices values of measurement model. Except SRMR and GFI, other fit indices have better actual values than the recommended values. Thus it indicates good fitness and we concluded our measurement and structural model are acceptable.

Table 4: Results of measurement and structural model fitness test

Fit Indices	Recommended Value	CFA	Structural Model	Conclusion
RMSEA	≤ 0.05	0.032	0.022	Good Fit
SRMR	≤ 0.05	0.057	0.094	Acceptable Fit
GFI	≥ 0.90	0.85	0.86	Marginal Fit
NFI	≥ 0.90	0.96	0.97	Good Fit
AGFI	≥ 0.80	0.81	0.83	Marginal Fit
CFI	≥ 0.90	0.99	1.00	Good Fit
PGFI	≥ 0.60	0.66	0.68	Good Fit
AIC	Saturated = 552.00	374.97	353.39	Good Fit (closer to saturated)
CAIC	Saturated = 1706.17	630.06	595.94	Good Fit (closer to saturated)

Note: chi2/df is the ratio between Chi-square and degrees of freedom, RMSEA is the Root Mean Square Error of Approximation, SRMR is Standardized Root Mean Square Residual, GFI is the Goodness of Fit Index, NFI is the Normed Fit Index, AGFI is the Adjusted Goodness of Fit Index, CFI is the Comparative Fit Index, PGFI is Parsimony Goodnes Of Fit Index, AIC is Akaike Information Criterion, and CAIC is Consistent Akaike Information Criterion.

Outcome of path diagram can be seen in Figure 2.

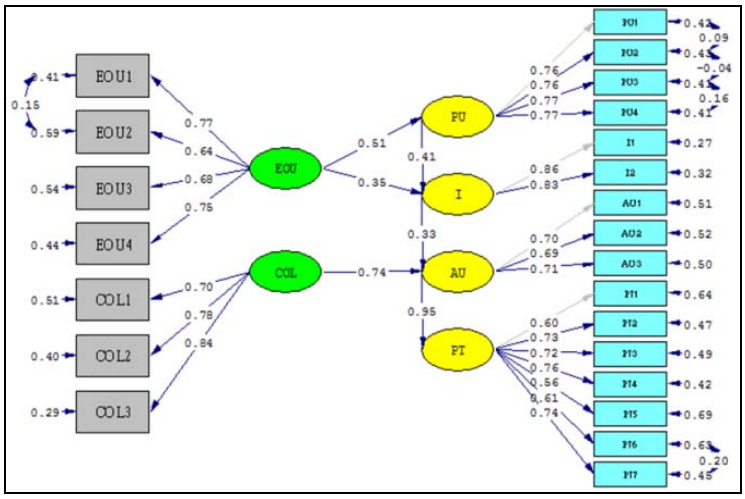

Figure 2: Structural model path diagram

Hypotheses Analysis

Summary of causal relationship test between structural model variables based on t-value produced by LISREL can be seen in Table 5. T-values should have ≥ 1.96 to indicate acceptance of a hypothesis. According to t-values in Table 5, all hypotheses in this study are accepted.

Our first hypothesis (H1) that says perceived ease of use of collaborative tools positively influences perceived usefulness of collaborative tools is accepted. It shows that students will find that collaborative tools are useful if they can use collaborative tools easily. Our second hypothesis (H2) that says perceived ease of use of collaborative tools positively influences students' intention to use collaborative tools in doing group's task is accepted. It means that if students can operate collaborative tools easily, it will drive the intention to use collaborative tools. For our third hypothesis (H3), perceived usefulness of collaborative tools positively influences student's intention to use collaborative tools in doing group's task is also accepted. This result indicates that when students believe that collaborative tools can improve their performance in the group, there will be the intention to use collaborative tools. Our fourth hypothesis (H4) is also accepted, the students' intention to use collaborative tools proved to give positive influence to the actual use of collaborative tools as supportive tools to complete group's task. It shows that the higher the intention to use collaborative tools in doing group tasks, so does the probability to actually use the collaborative tools. Whereas our fifth hypothesis (H5) shows that the collaborative learning activities significantly give positive influence to the actual use of collaborative tools to complete group's task. This imply that when students are given group's task which involve collaborative learning, they will utilize collaborative tool that supports communication and information exchange process in their group's collaboration. Our sixth hypothesis (H6) also shows significant correlation between the actual use of collaborative tools and performance of the group that use collaborative tools in doing their task. It means if students utilize collaborative tools to complete their task, then their group's performance will also improve.

Table 5: Hypotheses testing result

Hypotheses	T-value	Conclusion
H1: EOU → PU	5.29	Accepted
H2: EOU → I	3.28	Accepted
H3: PU → I	3.90	Accepted
H4: I → AU	5.04	Accepted
H5: COL → AU	8.26	Accepted
H6: AU → PT	6.74	Accepted

DISCUSSIONS

We conducted this research to find out which technology characteristic factors that will determine students' adoption of collaborative technology and also to see impact of collaborative technology to group's performance. Research result shows that TAM model developed by Davis (1989) can explain the use of collaborative technology in this research. The detailer explanation of the research results can be seen below.

The influence of perceived ease of use to perceive usefulness of collaborative tools
Data analysis showed that perceived ease of use positively influence perceived usefulness of collaborative tools. It is related to respondents' demography which came from Faculty of Computer Science UI students, who commonly use the technology in their learning activities, so they feel easy to operate collaborative tools. In this paper, perceived ease of use explains how the students feel easy to operate collaborative tools. Ease of use consists feeling of capable operating collaborative tools easily, for example the students can operate collaborative tools without being trained first. Other example is students feel they can use collaborative tools' feature to create the result they need, such as make a diagram, presentation visualization, etc. If students can remember how to do their task with collaborative tools easily, it means the tools are easy to use. When the student feels easy to use collaborative tools, they will also feel that collaborative tools are useful. Thus our result confirms the validity of TAM (Davis, 1989).

The influence of perceived ease of use and perceived usefulness to the intention to use collaborative tools
Hypotheses testing results showed that perceived ease of use and perceived usefulness of collaborative tools positively influence the intention to use collaborative tools in doing group's task. Perceived usefulness of collaborative tools represented by the increasing group's productivity, simplify group's collaboration, increase the effectiveness of collaboration process, and improve group's performance. Students' intention to use collaborative tools indicated by willingness to utilize collaborative tools in doing group's task, and willingness to use collaborative tools if they have internet access. This also implies that students will have intention to use the collaborative tools if they can operate it easily and if the tool is useful for them. Thus our results also confirm the validity of TAM (Davis, 1989).

The relationship between intention to use collaborative tools with the actual use of collaborative tools
Hypotheses testing result showed positive impact between intention to use collaborative tools and the actual use of collaborative tools. Actual use of collaborative tools indicated by utilization of collaborative tools to discuss and share opinion among group's member when doing group's assignment, and to monitor the assignment's progress. So the intention to use should be there first, before the students actually use collaborative tools. Again, we confirm the validity of TAM model (Davis, 1989).

The relationship between collaborative learning with the actual use of collaborative tools
Hypotheses testing result proved that collaborative learning positively influence the actual use of collaborative tools in doing group's task. Collaborative learning in this case is students' collaboration to accomplish coursework, also the information and knowledge sharing between group's members. Besides, a group is said doing collaboration if they distribute the task equally and then discuss each task's result together. Collaboration activity needs facilities which can support a collaboration such as to share information and knowledge, share references, etc. without being concerned by time, location and member's own activity. Because a coursework is obligatory and has deadline, students will have to use collaborative tools to finish their task on time, without the need to be presents in group's meeting and discussion physically. Various features provided by collaborative tools can help students to collaborate in a group, they can chat, upload files, edit documents simultaneously, and so on.

The relationship between the actual use of collaborative tools with performance of group who use it
Hypotheses testing results showed a positive correlation between actual use of collaborative tools and performance of group who use collaborative tools to complete their task. In this case, group's performance is measured by several indicators, such as make assignment planning first before actually doing the assignment, monitor the overall assignment progress even though each member has their own job, joining and coordination process conducted easily, and the presence of information sharing activity in a group. Other indicators is a state where each member give contribution to their group, supports each other when finishing the assignment, and communicate to each other well in a form of feedback for each other's task. Prove of positive correlation between actual use of collaborative tools and group's performance indicate that if students utilize collaborative tools in doing their assignment, then their group's performance will also improve. This result supports the research conducted by Majumdar & Krishna (2012) and Elie-Dit-Cosaque & Pallud (2012), about the use of collaboration technology will give positive influence to the group's performance.

IMPLICATIONS

Results of this study indicate that the use of collaborative tools have a positive impact on group performance. Therefore, students are expected to make use of collaborative tools in their group tasks as it is proven to improve the process of communication, interaction, and facilitate the exchange of information among members of the group. Students can make use of collaborative tools that have been equipped with a variety of features that support their group activities. In addition, lecturers are expected to also have a role to encourage students to use

collaborative tools, especially for professional programs in which students are mostly workers who certainly could not do face-to-face at any time. Collaborative learning is an option for lecturers to encourage the use of collaborative tools as it proved to be one of determinants of the use of collaborative tools. The use of collaborative tools may help the group to work together effectively and efficiently without any limitation of space and time.

The results of this study also showed that the ease of use and usefulness of technology are factors that determine the use of collaborative tools for the group tasks. Related to this, developers of collaborative tools are expected to continually evaluate their products to always be easy to use for students so that they will feel their usefulness. Although the features in existing collaborative tools now supports the collaboration process, there are still opportunities to add other features that provide more value for the benefit of students who use it.

The results also confirm the validity of TAM model related technology characteristics driving the use of technology. Perceived ease of use, usefulness, and intention to use a technology are all factors driving users to adopt the technology.

CONCLUSIONS

This research aims to study the determinants of collaborative tool adoption and its impact to group performance. Perceived ease of use and perceived usefulness of collaborative tools are two factors that drive the adoption of collaborative tools to accomplish group's assignment. In addition, group's collaboration activities that involve collaborative learning activity also proved as positively influence the use of collaborative tools in doing group assignment. This research also revealed that the use of collaborative tools to support the completion of group's task positively influences the group's performance. The utilization of collaborative tools in doing group's task can improve group's performance by being the media of communication, information and knowledge exchange/sharing, and media to give contribution for the group. Interaction between members of the group also becomes much easier. However, this paper still contains limitations as our research results only prove that collaborative tools utilization positively influence group's performance, which has not yet determine what kind of collaborative tools' feature actually could help to improve group performance. In the near future, it is still possible to conduct research which can overcome these limitations. For instance by further analyzing the collaborative tools and its varies features, to find out what kind of feature actually influence users performance in doing group collaboration. Other option is to find out the relationship between collaborative tools and team performance from user friendliness and user experience point of view.

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