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How social network applications enhancing team project collaborations at home

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Abstract

Team project collaboration is an important teaching and learning activity. Informal learning spaces are required to support such outside classrooms learning activity. There are increasing numbers of students who use virtual space platforms and social network applications (SNA) to support team project works at home. The objectives of this study were to understand how students used SNA to support team project works at home, how they learn about SNA, students' views of pro and con of SNA and how much students need any supports from higher education institutions (HEI) on this matter. This research used business students of a Bangkok private university as a case study. The results showed that though numerous advantages of SNA, students still valued face-to-face meetings in many phases of a team project. Students with higher grade point averages (GPA) reflected higher proportions of needs for HEI to teach them how to use SNA for team project collaboration at home than the lower GPA students.

Keywords: HEI, home, ILS, social network applications, virtual spaces.

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1. Introduction

1.1. Rational

Learning of students does not end within a classroom, especially when they are assigned individual projects and team projects. For team project, students need collaborations with group members, usually by working at informal learning spaces (ILS). On-campus ILS might not be sufficient and properly provided with needed facilities/equipment. However, nowadays with technology like virtual spaces and social network applications (SNA), students are able to work at home and collaborate concurrently with their team members faraway. The question is how universities can facilitate students to work on their team project at home through SNA. The following discuss three areas as follows: (1) using home as a part of ILS, (2) taking a team project as a part of teaching and learning and (3) using social media to support the team project at home.

1.1.1. Home as part of ILS

Teaching and learning can include many approaches besides lectures, such as individual project, assignment/homework and team project. These activities require ILS, which are non-discipline specific spaces frequently used by both staff and students for self-directed learning activities, inside and outside library spaces (Harrop & Turpin, 2013). ILS includes many types of on-campus and off-campus spaces, such as library, cafe, co-working spaces, virtual spaces and also home. *Home* is one important type of ILS that many students typically use to do many learning activities, including team project. Vanichvatana (2018) found from the previous research that there were many students who conducted 'Term Project/Team Project' and 'Group Discussion' at 'Home/Dorm'.

1.1.2. Team project as part of teaching and learning

Team project is an important teaching and learning approach, especially in higher education institutions (HEI) business programs. This teaching and learning approach improves many students' skills which are essential for employment, such as interpersonal and communication skills. To conduct team projects, students required group collaborations outside classrooms, both inside and outside university territories. However, not every HEI can be able to provide proper and enough on-campus ILS. In addition, students might prefer to work off-campus. With the merits of virtual space and SNA, students are able to work apart together for team project.

1.1.3. SNA to support team project at home

There are many technical terms in this area. This research limits only three groups of terms: virtual space, social media/social network and SNA. First, virtual space is internet platform or online environment (IGI Global, n.d.; Science Direct, n.d.). Second, both social media and social network have similar meaning as the shared of online communications channels/websites developed for community-based input, interaction, content-sharing and collaboration. Third, there are many SNA, such as Facebook and Google (Tech Target, n.d.; Cambridge Dictionary, n.d.). It can be comprehended that virtual space is an online-platform/internet-environment, where websites in the forms of social media/social network can be applied, as so called SNA. SNA can be developed by corporates or individuals as websites—that allow people to share content quickly, efficiently and in real-time (Hudson, 2019).

Virtual spaces have been changing the internal nature of education (Kio & Negreiros, 2013; Park, 2011). Web tools facilitate platforms for students to extend-then-combine their own formal learning into more informal places (Hall, 2009). Many social network applications support not only team communication but also team working concurrently apart. Each student might choose each own convenient in (a) learning schedule, (b) preferred supporting facilities and (c) atmosphere and environment (Cunningham & Walton, 2015; Harrop & Turpin, 2013; Hunter & Cox, 2014; Kumar & Bhatt, 2015; Riddle & Souter, 2012). University libraries provide opening hours vary widely—from government official working hours (around 8:30 to 16:30) to 24/7, and with or without weekends

(Vanichvatana, 2016). On-campus ILS might not provide necessary supporting facilities, such as Wi-Fi, power sockets, study tables and comfortable chairs, might not enough or available. Preferred atmosphere and environment for each student might not be the same. Some students prefer spaces that are allowed social discussions, while some students prefer quiet ones (Vanichvatana, 2018). A clear benefit of SNA is that it allows members of team project to communicate and work concurrently apart. Some popular SNA include Google Doc, Google Hangout, Line Group, Line-Ladder Shuffle, Line-Poll Multi-Vote, Line-Schedule, Facebook, World Online 365, Instagram and WeChat.

Assisting students' learnings through team project approach should be a part of important roles of HEI. However, some universities might not be able to provide/improve on-campus ILS to support team projects for all needed students. Furthermore, universities should not leave students on their own responsibilities to find off-campus ILS, such as working at café or renting co-working spaces. A question rises as how such universities can support students' group collaboration for team project.

The objectives of this research were to find out how students use SNA to support their team project collaborations at home. The aims of this study were to understand: (a) the way(s) that students *learn* to use SNA, (b) the characteristics that students *use* SNA to support team project works, (c) the advantage(s) and the disadvantage(s) of SNA and (d) any need from students for HEI to support them in this issue. The ultimate goal was to know whether a university can support students to do team project collaborations at home by using SNA or not. The scope the study took undergraduate students studying the business school of a Bangkok private university (BPU) in Thailand as a case study.

2. Methodology

This research applied both qualitative and quantitative research approaches. The qualitative research was conducted first, through direct interviews—to gain initial understanding how students used SNA for team projects. The second step, quantitative analysis through online survey and descriptive analysis were conducted—to identify the specified objectives and gain further understands. The third and last step was conducting the second round of qualitative analysis, through focus group—to clarify any questions gained from the survey and analysis results. These three steps were conducted in April, 2019.

The case study is business students at a BPU. This international university is located in the far eastern side of Bangkok, Thailand. The total number of students (population) who attended this business programs were about 6,000 students. The teaching and learning is conducted in English. Students are from more than 80 nationalities. However, the majority of students are Thai, around 85% of the population.

2.1. Direct interviews

The first round of qualitative analysis start with conducted direct interviews with four students, two top students and two weak students. The direct interviews start with the two students who were top students. The first part of the interview asked and found that each of these top students used many types of SNA for learning activities. However, both top students used *Google Doc* as the main SNA to support their online team project collaborations. The rest of the interview questions were then focused on Google Doc applications, including 'How' these students firstly learned about Google Doc and 'When' they firstly learned how to use Google Doc.

The second part of the interview was to understand which phases of a team project that students uses SNA. A team project can be divided into four phases: (i) Early phase—brain storm/identify scope phase, (ii) Middle phase—working/writing phase, (iii) Final phase—work combine phase and (iv) Presentation rehearsal phase. The next part was to further learn whether students still needed 'Face-to-face (FTF) meetings' for team project works—if so—which phases of group projects needed FTF. The results from the discussions from the two top students were similar. In the early phase, the

students used FTF. SNA was then used during the middle and final phases. FTF was necessary again for the presentation rehearsal phase.

FTF interaction was mentioned to be important in the early phase—to brain storm and identify scope of assignments, and in the presentation rehearsal phase. In the early phase, FTF enhance team members to have better communications with body languages. Such body languages, including direct eye contacts, weak students who usually keep quiet cannot avoid team work responsibilities. During FTF at the presentation rehearsal phase, team members can make comments to improve each other presentation performances.

As stated by many research, FTF interaction shows to improve communication, trust and better working relationships (AIB Blog, 2016; Blenke, 2013). The benefits of FTF communication are showing body language, building relationships, valuing the other person and creating bond, boosting effectiveness (clearer and details communication), protecting confidentiality, enhancing trust and credibility and creating more motivation (ezTalks, 2017; Free Management eBooks, n.d.).

The third and the last part were to understand the students' view about advantages and disadvantages of using SNA for team projects. For advantages, the top students revealed that, with SNA, students can work together concurrently apart. No student can make any more excuses on inconvenience on meeting time and meeting venues. For disadvantages, working far apart might create some misunderstandings. But, if team members were able to well agree upon during the early phase, the team confusion would be lessened. The final question was to ask if students need any support from the university on this matter. Both top students agreed that it would be better if the university could organise classes to teach students how to use Google Doc and other SNA to support team projects, as early as in freshman year.

The interviews with the two weak students were taken places later. The interview results with these two weak students were similar to the interviews with the top two students in some questions. However, the answers from the weak students were without self-assured opinions. These last two students had no idea in many questions.

2.2. Online surveys

The results from the direct interviews were used to develop the questionnaire form. The questionnaire consists of nine questions, shown in the nine sections in the Results. The questionnaires were created on an online survey: Google Form Application. A QR-code of this electronic questionnaire was created. The QR code was distributed to students by lecturers in four selected required business core courses, for each undergraduate level: freshmen, sophomores, juniors and seniors. There were the total of 500 returned e-survey respondents. The data were analysed by the descriptive analysis.

The whole 500 returned e-survey respondents consist of 131 freshman (26.2%), 160 sophomores (32%), 84 juniors (16.8%) and 125 seniors and over-seniors (25%). When analysed in the aspect of grade point averages (GPA), the data consist with the following proportions: < 2.00 (4.8%, 24), 2.00–2.50 (24%, 120), 2.51–3.00 (30%, 150), 3.01–3.50 (23.6%, 118) and >3.50 (17.6%, 88). The outcomes from the descriptive analysis are presented in the Results section.

2.3. Focus group interview

The second round of qualitative analysis was conducted through the focus group interviews with a senior year class. The objective of this interview was to reconfirm some results found from the online survey conducted in the previous step. There were two main questions in this focus group interviews. The first question was about the year that students learned how to use Google Doc for team project collaboration. Most students learnt this SNA since freshman or sophomore years. But, there was one student who revealed that he had just learnt about Google Doc in his junior year. The second question

was about whether students needed the university to provide classes on how to use SNA for team project collaborations. Almost all students agreed that they preferred the university to teach Google Doc in classrooms.

3. Results

This section show the findings from the online surveys, based on the following nine questions: (1) What types of ‘SNA’ did students most often use when they studied at home?, (2) Which phase(s) of team projects did students use SNA?, (3) Which phase(s) of team projects did students used ‘FTF meetings’?, (4) How did students first learn about ‘SNA’ to support team projects?, (5) Since when did students start using SNA for team projects?, (6) Since when did students start using Google Doc for team projects?, (7) What is the advantage(s) of using SNA for team projects?, (8) What is the disadvantage(s) of using SNA for team projects? and (9) Should the university teach how to use SNA for team projects in classrooms?

Questions 2, 3, 4, 5, 6 and 9 were further analysed based on two students’ attributes (a) GPA and (b) undergraduate levels. Figure 1 shows the histogram charts for the first questions. Figures 2.1–7.2 show stacked columns as the results for the rest of the questions.

Question 1: What Types of SNA Did Students Most Often Use When They Study at Home?

There were nine choices of social network applications and one open choice for this question. Figure 1 shows the frequency of the nine choices. The number of responds and percentages (in parenthesis) are listed from high to low as follows: (4) Line Group 397 (79.4%), (2) Google Drive/Google Doc 312 (62.4%), (8) Facebook 210 (42%), (9) Word online 365—103 (20.6%), (1) WeChat 73 (14.6%), (7) Line-schedule 26 (5.2%), (3) Google Hangout 18 (3.6%), (5) Line-Ladder shuffle 15 (3%), (6) Line-Poll Multi-vote 14 (2.8%). For the open question, ‘Others’, there are three more SNA added: (10) Instagram 8 (1.6%), (11) YouTube 1 (0.2%) and (12) Google Translate 1 (0.2%).

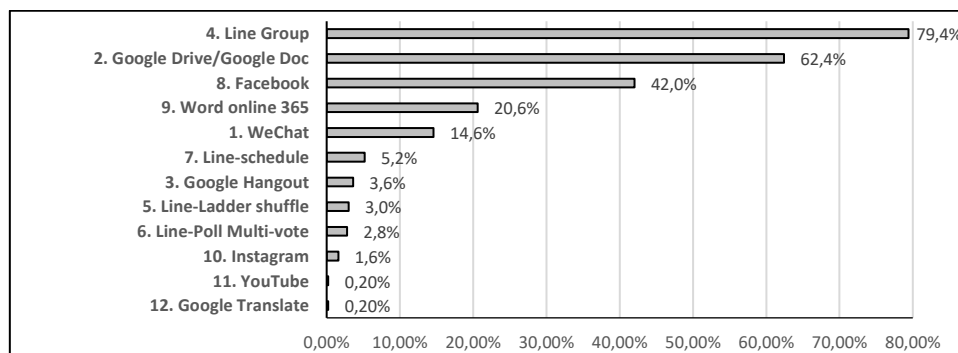


Figure 1. Types of social network applications students most often use when study at home

Question 2: Which Phase(s) of Team Projects Did Students Use SNA?

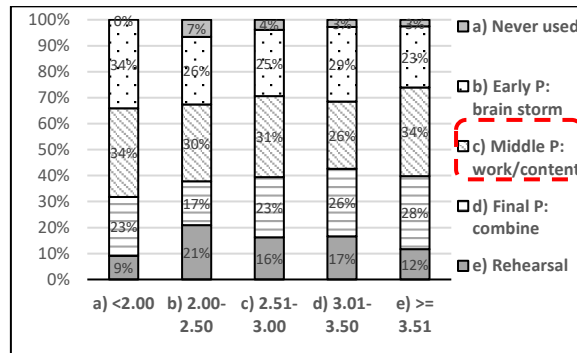


Figure 2.1. Phase(s) of team projects use SNA, by GPA

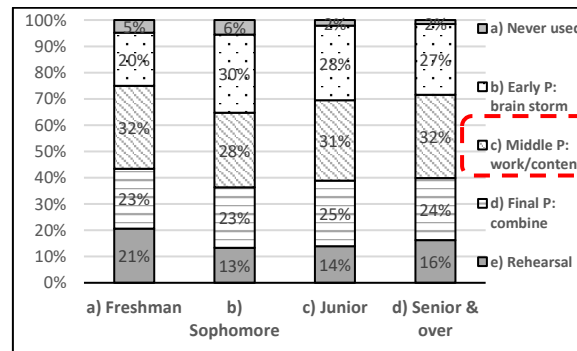


Figure 2.2. Phase(s) of team projects use SNA, by undergraduate levels

The respondents reflected the frequencies and percentages to *Use SNA* in each team project phase as: 'a) Never used' (34, 6.8%), 'b) Early phase' (240, 48.0%), 'c) Middle phase' (277, 55.4%), 'd) Final phase' (214, 42.8%) and 'e) Rehearsal' (146, 29.2%). The data in each category [(a) to (e)] were then analysed based on GPA (in five levels of GPA) and on undergraduate levels (in four levels). The analysis results based on GPA are shown in the five stacked columns in Figure 2.1, while those based on undergraduate levels are shown in the four stacked columns in Figure 2.2.

The next step was the calculations of the averaged percentages of the frequency to use SNA in each phase. That is, this step calculated the average of all percentages from each same phase of all levels of GPA. For an example, the calculation for the averaged percentage of using SNA in 'b) Early phase' equals to: $(34\% + 26\% + 25\% + 29\% + 23\%) / 5 = 27.6\%$. The calculations were conducted until receiving all averaged percentages of every team project phase. Based on GPA, the averaged percentages of each team project phase are: 'a) Never used' = 3.2%, 'b) Early phase' = 27.6%, 'c) Middle phase' = 31.0%, 'd) Final phase' = 23.3% and 'e) Rehearsal' = 14.9%.

Base on undergraduate levels, the averaged percentages of each team project phase are: 'a) Never used' = 3.5%, 'b) Early phase' = 26.3%, 'c) Middle phase' = 30.5%, 'd) Final phase' = 23.6% and 'e) Rehearsal' = 16.0%. These averaged percentage values were summarised in Table 1.

Question 3: Which Phase(s) of Team Projects Did Students Use 'FTF' Meetings?

The respondents reflected the frequencies and percentages to *Use FTF Meetings* in each team project phase as: 'a) Never used' (42, 8.4%), 'b) Early phase' (272, 54.4%), 'c) Middle phase' (161, 32.2%), 'd) Final phase' (151, 30.2%) and 'e) Rehearsal' (187, 37.4%). Repeating as in the previous section, the data in each category [(a) to (e)] were analysed, based on GPA (in five levels of GPA) and on undergraduate levels (in four levels). The analysis results based on GPA are shown in the five stacked columns in Figure 3.1, while those on undergraduate levels are shown in the four stacked columns in Figure 3.2.

Similar to the previous section, the next step was the calculations of the averaged percentages of the frequency to use FTF in each phase, based on GPA and undergraduate levels. Based on GPA, the averaged percentage values of each team project phase are: 'a) Never used' = 4.8%, 'b) Early phase' = 34.3%, 'c) Middle phase' = 20.2%, 'd) Final phase' = 18.0% and 'e) Rehearsal' = 22.8%. Based on undergraduate levels, the averaged percentage values of each team project phase are: 'a) Never used' = 5.7%, 'b) Early phase' = 33.3%, 'c) Middle phase' = 19.4%, 'd) Final phase' = 18.6% and 'e) Rehearsal' = 23.0%. These averaged percentage values were then put in Table 1.

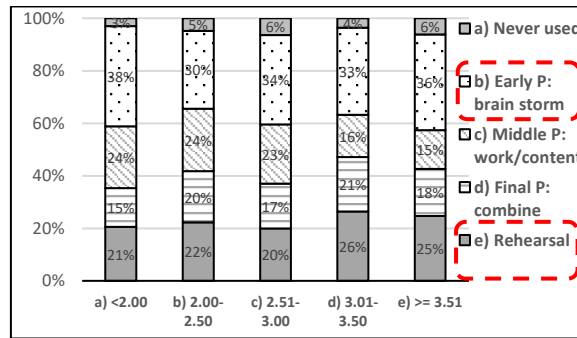


Figure 3.1. Phase(s) of Team Projects Use 'FTF' Meetings, by GPA

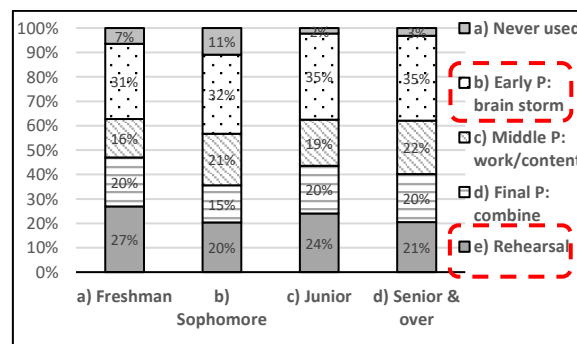


Figure 3.2. Phase(s) of team projects use 'FTF', by undergraduate levels

Table 1. Comparison of the averaged percentages of the frequencies to use SNA versus FTF in each team project phases, based on GPA and year of study

Based on →	Averaged Percentages of Frequencies to Use SNA in Team Projects (From Q2, Fig.2.1 and Fig. 2.2)		Averaged Percentages of Frequencies to Use FTF in Team Projects (From Q3, Fig.3.1 and Fig. 3.2)	
	GPA	Undergraduate Levels	GPA	Undergraduate Levels
a) Never used	3.2%	3.5%	4.8%	5.7%
b) Early Phase	27.6%	26.3%	34.3%	33.3%
c) Middle Phase	31.0%	30.5%	20.2%	19.4%
d) Final Phase	23.3%	23.6%	18.0%	18.6%
e) Rehearsal	14.9%	16.0%	22.8%	23.0%

The data in Table 1 consist of the averaged percentages of the frequencies to use SNA during each team project phase. The calculation results were from question 2 and 3. The data on the second and third columns are from Question 2 (Q2), based on GPA and undergraduate levels. The last two columns are from Question 3 (Q3), based on GPA and undergraduate levels.

Question 4: How Did Students Learn About 'SNA' to Support Team Projects Collaborations?

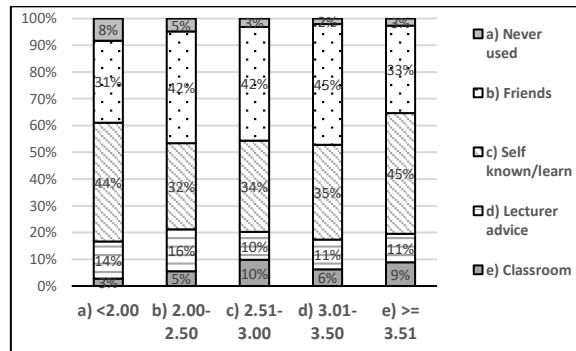


Figure 4.1. How students learn about SNA for team projects, by GPA

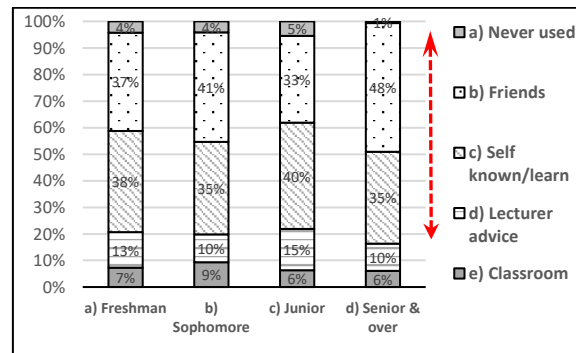


Figure 4.2. How students learn about SNA for team projects, by undergraduate levels

The respondents reflected the frequencies and percentages how they learned to use SNA for team project collaborations from each approach as: ‘a) Never used’ (22, 4.4%), ‘b) Friends’ (256, 51.2%), ‘c) 231, 46.2%), ‘d) Lecturer advice’ (76, 15.2%) ‘e) Classrooms’ (47, 9.4%). With the similar process as above, the data in each category [(a) to (e)] were further analysed, based on GPA and undergraduate levels. Figure 4.1 shows the percentages of each approach that students learned how to use SNA, based on GPA. Figure 4.2 shows the percentages of each approach that students learned how to use SNA, based on undergraduate levels.

Question 5: Since When Did Students Start Using SNA for Team Projects?

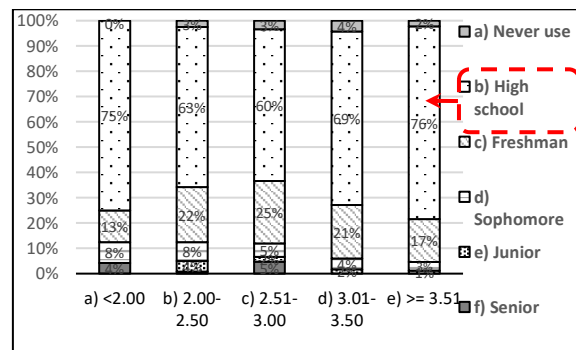


Figure 5.1. Since when did students start using SNA for team projects, by GPA

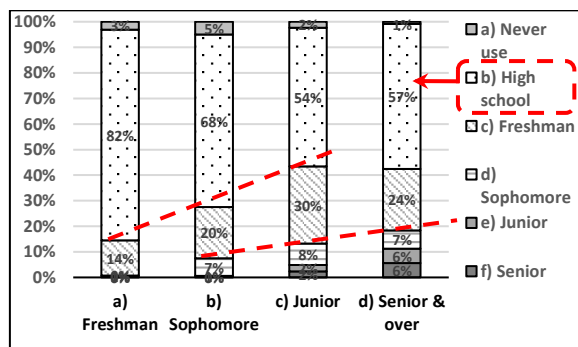


Figure 5.2. Since when did students start using SNA for team projects, by undergraduate levels

The respondents showed the frequencies and percentages of since when they start used SNA in each study levels: 'a) Never used' (15, 3.0%), 'b) High school' (332, 66.4%), 'c) Freshmen' (106, 21.2%), 'd) Sophomores' (106, 21.2%), 'e) Juniors' (27, 5.4%) and 'f) Seniors' (9, 1.8%). The data in each category ((a) to (f)) were then analysed based on GPA (in five levels of GPA) and on undergraduate levels (in four levels). The analysis results based on GPA are shown in the five stacked columns in Figure 5.1, while those based on undergraduate levels are shown in the four stacked columns in Figure 5.2.

Similar to the previous section, the next step was the calculations of the averaged percentages of the frequency of when students started using SNA in each category of study levels, based on GPA and undergraduate levels. Based on GPA, the averaged percentages of each study level are: 'a) Never used' = 2.5%', 'b) High school' = 68.6%, 'c) Freshmen' = 19.4%, 'd) Sophomores' = 5.8%, 'e) Juniors' = 1.8% and 'f) Seniors and over-seniors' = 1.9%. Base on undergraduate levels, the averaged percentages of each choice are: 'a) Never used' = 2.8%, 'b) High school' = 65.2%, 'c) Freshmen' = 22.0%, 'd) Sophomores' = 5.6%, 'e) Juniors' = 2.3% and 'f) Seniors and over-seniors' = 2.0%'. These averaged percentages were then put in Table 2.

Question 6: Since When Did Students Start Using 'Google Doc' for Team Projects?

The respondents reflected the frequencies and percentages of since when they start using Google Doc for team projects in each category of study levels as: 'a) Never used' (26, 5.2%), 'b) High school' (182, 36.4%), 'c) Freshmen' (195, 39.0%), 'd) Sophomores' (64, 12.8%), 'e) Juniors' (20, 4.0%) and 'f) Seniors' (12, 2.4%). The data in each category [(a) to (f)] were then analysed based on GPA (in five levels of GPA) and on undergraduate levels (in four levels). The analysis results based on GPA are shown in the five stacked columns in Figure 6.1, while those based on undergraduate levels are shown in the four stacked columns in Figure 6.2.

Followed the similar process as above, the survey results, shown in Figures 6.1 and 6.2, were then calculated to get the averaged percentages of the frequency of when students started using Google Doc in each category of the study levels, based on GPA and undergraduate levels. Based on GPA, the averaged percentages of each study level are: 'a) Never used' = 5.2%', 'b) High school' = 37.6%, 'c) Freshmen' = 39.2%, 'd) Sophomores' = 12.3%, 'e) Juniors' = 3.2% and 'f) Seniors and over-seniors' = 2.5%. Base on undergraduate levels, the averaged percentages of each choice are: 'a) Never used' = 4.7%, 'b) High school' = 35.7%, 'c) Freshmen' = 38.8%, 'd) Sophomores' = 14.0%, 'e) Juniors' = 4.3% and 'f) Seniors and over-seniors' = 2.5%'. These averaged percentages were then put in Table 2.

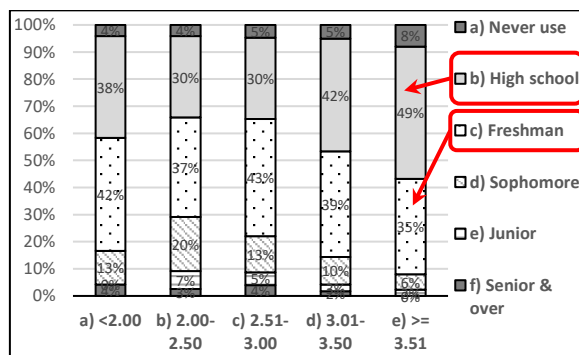


Figure 6.1. Since when students start using 'Google Doc' for team projects, by GPA

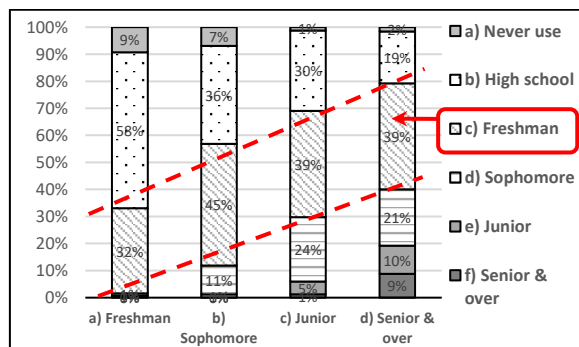


Figure 6.2. Since when students start using 'Google Doc' for team projects, by undergraduate levels

Table 2. Comparison of the averaged percentages of since when students used SNA versus Google Doc, based on GPA and year of study

Based on →	When Start Using SNA to Support Team Projects (From Q5, Figures 5.1 and 5.2)		When Start Using Google Doc to Support Team Projects (From Q6, Figures 6.1 and 6.2)	
	GPA	Undergraduate Levels	GPA	Undergraduate Levels
	a) Never used	2.5%	2.8%	5.2%
b) High school	68.6%	65.2%	37.6%	33.7%
c) Freshman	19.4%	22.0%	39.2%	38.8%
d) Sophomore	5.8%	5.6%	12.3%	14.0%
e) Junior	1.8%	2.3%	3.2%	4.3%
f) Senior and Over	1.9%	2.0%	2.5%	2.5%

The data in Table 2 consist of the averaged percentages of the frequencies of when the respondents started using Google Doc in each study levels. The results were from Question 5 (Q5) and Question 6 (Q6). The data on the second and third columns are from Question 5 (Q5), based on GPA and undergraduate levels. The last two columns are from Question 6 (Q6), based on GPA and undergraduate levels.

Question 7: What Is the Advantage(s) of Using SNA for Team Projects?

This question showed six choices of the advantages to use SNA for team projects with the following frequencies and percentages: Everyone can work concurrently 349 (69.8%), Instant sharing contents/pictures 258 (51.6%), Instant checking by group members' works 177 (35.4%), Save travelling time 184 (36.8%), No need to find a meeting place 163 (32.6%) and No need to schedule a meeting 84 (16.8%). There were two additional open comments as follows: Very convenient tool to communicate with team members 1 (0.2%), and Easy to find the information 1 (0.2%).

Question 8: What Is the Disadvantage(s) of Using SNA for Team Projects?

This question offered four choices of the disadvantages to use SNA for team projects with the following frequencies and percentages: Can create miscommunication 302 (60.4%), Need to talk FTF 283 (56.6%), No inspiration 99 (19.8%) and Impractical to study on social networking applications at home 88 (17.6%). There were two additional open comments as follows: Some people do not do anything and do not answer 1 (0.2%) and there is no disadvantage for using SNA 1 (0.2%).

Question 9: Should the University Teach How to Use SNA for Team Projects in Classrooms?

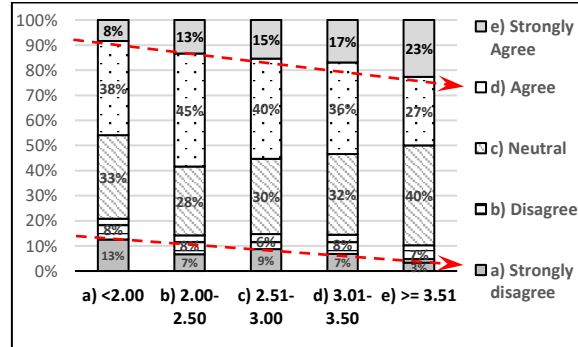


Figure 7.1. Should the university teach SNA for team projects in classrooms, by GPA

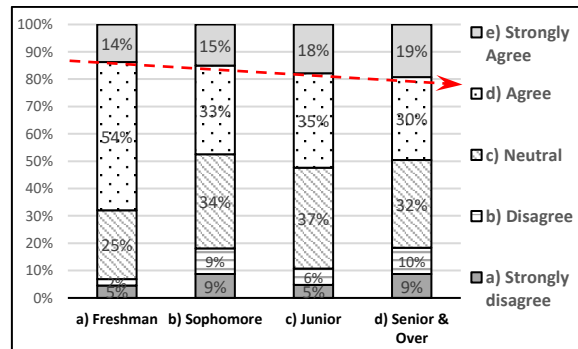


Figure 7.2. Should the university teach SNA for team projects in classrooms, by undergraduate levels

The respondents showed the frequency and percentages of whether the university teach SNA for team projects in classrooms as follows: ‘a) Strongly disagree’ (35, 7.0%), ‘b) Disagree’ (35, 7.0%), ‘c) Neutral’ (159, 31.8%), ‘d) Agree’ (190, 38.0%) and ‘e) Strongly agree’ (81, 16.2%). Repeating as in the previous sections, the data in each category [(a) to (e)] were analysed, based on GPA (in five levels of GPA) and on undergraduate levels (in four levels). The analysis results based on GPA are shown in the five stacked columns in Figure 7.1, while those on undergraduate levels are shown in the four stacked columns in Figure 7.2.

4. Discussions

The results from the previous sections answer the four research objectives: (a) the ways that students learned to use SNA, (b) the characteristics that students use SNA to support team project works, (c) the advantages and disadvantages of SNA and (d) any need from students for HEI to support them is this issue.

(a)The ways that students learned and used SNA.

Top frequently used SNA by students when they study at home: From Figure 1, the top three types of SNA were (1) Line Group 397 (79.4%), (2) Google Drive/Google Doc 312 (62.4%) and (3) Facebook 210 (42%).

How did students learn about SNA to support team projects collaborations? Students learned about SNA from friends and from self-known/self-learned as the first and second ranks, respectively. These two top frequencies are also ranks from the analysis based on both GPA and undergraduate levels, shown in Figures 4.1 and 4.2.

Since when did students start using SNA versus Google Doc for team projects? There are three considerations in this aspect. Firstly, GPA and undergraduate levels make no difference in term of the time that students started using SNA and Google doc for team projects. From Table 2 on the second and third columns, 'When Start Using SNA' columns, the data in each of the six pairs [from rows (a) to (f)] are similar. Likewise for 'When start Using Google Docs' columns, the data in each of the six pairs [from rows (a) to (f)] are also similar. Secondly, students started using SNA earlier in their life than started using Google Doc. This can be seen that the averaged percentages of students learned SNA since 'High school' are almost double higher than those of Google Doc. For an example, in SNA are 68.6% and 65.2% and in Google Doc are 37.6% and 33.7%, respectively. Figures 5.1 and 5.2 also support this analysis. Thirdly, students with higher GPA start using Google Doc sooner than students with lower GPA. Figure 6.1 supports this aspect. That is, students with GPA over 3.0 reflected with higher percentages to start using Google Doc, since their high school and freshmen, than other levels of GPA. Figure 6.2 shows that there are more percentages of younger level students who start using Google Doc than those of the older level students.

(b) The characteristics that students who used SNA to support team project

Phases of team projects to use SNA versus FTF: Table 1 shows the data for this comparison. In the 'Early phase (brain storm/identify scope)' and 'Presentation Rehearsal phase', students used FTF more than SNA. In the 'Middle phase (working/writing)' and 'Final phase (work combine)' students used SNA more than FTF. It can also be noticed that the data in both GPA and undergraduate levels aspects are similar in all pairs of comparisons.

(c) The advantages and disadvantages of SNA

Students reflected that there are many advantages of SNA, especially in terms of supporting: 'work concurrently', 'instant sharing contents/pictures' and 'instant checking by group members' works'. Moreover, from the direct interviews with two top students, SNA can also provide auto saving mechanism (backup files), which their team's works will be stored on cloud. These features do not only secure their works but also allow each team members can access their works anyplace and any times. Furthermore, no team members can have any excuses for not having work files or accessibility to work.

However, there are still disadvantages of SNA. Besides the views that students still valued FTF meetings, some students reflected that working at home apart from team members made them no inspiration. Some students also revealed that it was impractical to study on social networking applications at home. The direct interviews with two top students also supported that when working apart on SNA, the teammate are less connected. With FTF meetings, the teammates are able to create bonding time. In addition, voice communication and texts, without seeing each other FTF, can create misunderstandings. 'Body language' speaks a lot more.

(d) Any need from students for HEI to support in this issue / , and need from students for support from the university

It is very interesting to see that students with higher GPA had higher percentages of 'Strongly Agree' that the university should teach SNA for team projects in classrooms. Figure 7.1 supports this

aspect. In addition, Figure 7.2 also shows that students with more senior years reflected gradually higher percentages of 'Strongly Agree' than those in the lower undergraduate levels.

5. Conclusions

Many new knowledges from this research are highlighted here: (1) Even with marvelous advantages of SNA, the traditional style 'FTF meetings' are still important as parts for team projects. (2) Students still need the university to teach them knowledges about technology. Even though almost all lecturers believe that new generation students are able and better to learn about new technologies by themselves. These results create a question that may be *educators might overestimate the ability of students on this matter*.

5.1. Limitations

the research scope is based on the data, both qualitative and quantitative analysis, gathered from students at a business school of a private university in Bangkok, Thailand. *Further study still needs*: it is interesting to explore these issues with students who study at public universities, especially top ranks universities.

The research has reached the ultimate goal to find out HOW a university can support students to do team project collaborations at home. HEI have many important roles to support students' learnings with team project approach. (1) For the early phase (brain storm and identify scope) and presentation rehearsal phase, the university should support students with sufficient/proper on-campus ILS and related facilities. Such ILS will allow students to make a FTF meeting which is an important part of team project works. (2) For the middle phase (working/writing parts) and final phase (work combine), there are students who still need the university to teach them in classrooms—how to use social network applications (SNA), especially Google Doc, so that they can work efficiently on team projects at home.

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