

21st Century Skills and the Engineer: Graduate Students' Perceptions of Teamwork at METI, University of Port Harcourt

Gordon Monday Bubou, Emmanuel Emeka Ejim-Eze, Festa Ndutimi Okrigwe

Abstract— This paper reports on postgraduate engineering students' perceptions of teamwork in Nigeria. Using a mix methodology (both quantitative and qualitative techniques), findings, like previous studies, were indicative of the fact that postgraduate students too can acquire certain generic skills [informational skills, problem solving skills, collaborative (people) skills] required of the modern day scientist and engineer to function effectively both in the work place and outside the work environment. This is besides deriving academic benefits (better comprehension and improved performance) and social benefits from teamwork. Participants expressed their desire to participate in future teamwork. As society and employers continuous to place premium on 21st century skills, it is advocated that educators should devise pedagogical tools to facilitate the development of teaming skills. Further research is suggested to cover a cross-section of faculties and multiple universities.

Index Terms— Teamwork, collaborative learning, perceptive surveys, 21st Century skills, generic skills, engineering graduates, METI, University of Port Harcourt

1 INTRODUCTION

1.1 Background of the study

The new global economy in the 21st Century have its peculiar challenges and demands increasingly higher skills; such that candidate for high-end careers in engineering, design, technology, architecture, etc. are required to possess 21st century skills sets – literacy, numeracy, informational skills, problem solving skills, collaborative (people) skills, entrepreneurial skills, etc. to deal with the challenges. Essentially, teamwork and innovation abilities are critical in the profile of the new engineer [1]. Thus, generic skills are increasingly be emphasized by stakeholders [2]. However, some employers in Malaysia agreed that the technical graduates have good technical skills, but not a motivation, interpersonal, critical thinking, problem solving and entrepreneurship skills [3]. This scenario has become a global phenomenon with the situation being worse in sub-Saharan Africa. This seriously affects the employability of graduates, especially of technical disciplines in Nigeria. Accordingly, Duch in [4] concluded that, university lecturers generally agree that they need to assist students in developing their critical- thinking skills, problem-solving abilities, and teamwork values [5]. According to [5], a research by Keyes and Burns in 2008 concluded that group assignments improved undergraduate student learning while developing essential teamwork, communication, and leadership skills.

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Interestingly too, teamwork and collaborative abilities are critical in the profile of the engineer and scientist in this current emerging world order that has become pro-soft-skills. More, teamwork skill is also important for the university students because the skill can prepare themselves better for the highly competitive and collaborative working environment [4]. Unfortunately, it is noteworthy that, in general, students are often not prepared for teamwork (Vidal-Carreras et al., 2013) [6]. It then means, they must, as a necessity, develop effective teamwork skills prior to entering the workforce [7]. This is more so, when such individuals are moving up the ladder in careers towards becoming managers. Cooperative student-centred teaching/learning strategies offer viable opportunities to develop such important skills. Consequently, one way to developing the aforementioned skills at Institute of Engineering, Technology and Innovation Management (METI), University of Port Harcourt is to have students work in teams. An ice-breaker and a daylong teambuilding activity mark the commencement of every new session at METI. These postgraduate programmes at METI are designed in such a manner that compulsorily; students participate in group activities including group assignments in some cases for each of the courses taught in the programme. This method is in line with [5] thinking, who maintain that group assignments provide the opportunity for cooperative learning (CL) which is different from individual, competition-based learning; rather, group assignments require students to learn together in a team environment.

1.2 Purpose of the study

Zou et al [4] Maintains that, although group assignments are currently the most widespread technique to develop teamwork skills in graduates, little research has been done to investigate,

- G.M. Bubou is a Principal Researcher Officer/HoD Technology Management Education Training, NACETEM South-South Office. PhD student of Technology Management, Institute of Engineering, Technology & Innovation Management (METI) University of Port Harcourt, Nigeria. PH-2347033811861. E-mail: gbubou@gmail.com
- E.E. Ejim-Eze is Research Officer/HoD Science Policy and Development Studies, NACETEM South-South. PhD student of Technology Management at METI. PH-2347033024371. E-mail: ezeigwe1949@gmail.com
- F.N. Okrigwe is Research Office with NACETEM South South and a Masters student of ICT Management at METI. PH-2348036671871. E-mail: festa_okrigwe@yahoo.com

from students' perspective, the benefits and difficulties of group formation, process monitoring, team performance, and assessment for group assignments. Equally, while there have been few empirical studies that explore postgraduate students' experience and perceptions of one phenomenon or the other, it appears that little or no studies have been undertaken to investigate the postgraduate students' perception of teamwork in Nigerian universities. Similarly, most studies on CL are focused on English for Academic Purposes [8], [9], [10], [5], [11]. Consequently, of this study aims to address this gap in the literature by determining postgraduate students' perceptions teamwork; how CL affects performance outcomes at the postgraduate level and how knowledge was affected by participation in group assignments. Additionally, we describe our current research focusing on exploring possibilities to scaffold teamwork in postgraduate level science and engineering programmes in Nigerian universities.

1.3 Research Questions

There is a growing interest in studying students' perceptions on teamwork. However, as earlier stated, there are few, if any, studies that have investigated attitudes about postgraduate students' perceptions of teamwork in a Nigerian university. We decided to revisit some the issues raised by [12], [7]. Thus, the specific issues we set out to answer included:

- 1) What constitutes postgraduate (science and engineering) students' perceptions (understanding, attitude, experience) of teamwork as a part of their professional roles?
- 2) Do postgraduate students perceive teamwork as positive learning experiences?
- 3) How to improve team formation procedures?
- 4) What can lecturers do to better manage student teamwork?

2 LITERATURE REVIEW

This literature review draws on research insights provided from perception studies from varied backgrounds and levels of educations. The literature on postgraduate engineering students' perceptions on teamwork represents a very small portion of all the research (as much as gleaned by the researchers) on perceptive or attitudinal studies on teamwork.

2.1 Perception Surveys

Students' perception of various concepts and phenomena – courses, methods/techniques, pedagogical contents, teaching/learning modes, etc. has been studied by various researchers over the years. According to Lewis and Seymour [13], perceptive (attitudinal) surveys may take many forms and address a range of issues, they typically consist of a series of statements that students are asked to express their agreement or disagreement using a scale. Vidal-Carreras et al [6] identified 14 perceptions and classified them as representing either a positive perception, or a negative perception of teamwork for the students. This type surveys provide valuable information on student perceptions of and emotions regarding their classroom experience – includes general attitudes toward

the course, the discipline, and their own learning [13]. The authors concluded that results from such surveys can also help in identifying elements in courses that best support student learning.

For instance, [12], [14], [6] studied students perceptions of teamwork in universities; [15], [16] was ...toward developing generic skills at university, work placement and employment, [8], [7], [17] was on students' perception of collaborative learning; [18] on group projects and team problems; [19] studied student's perceptions of the quality of online courses and the technologies employed; [9] studied students' perceptions of learning vocabulary in a computer-supported collaborative environment; and [20] explored the perceptions of student in an online accounting class. Others are: the works of [21] centred on students' perceptions of online or face-to-face learning and social media..., and that of [22] was on students' perceptions on technological supports for problem-based learning. The list is endless.

2.2 21st Century (Generic) Skills Sets

According to Angel Gurría, Secretary-General of the Organisation of Economic Cooperation and Development Countries (OECD) "the way we live and work has changed profoundly – and so has the set of skills we need to participate fully in and benefit from our hyper-connected societies and increasingly knowledge-based economies" [23]. Likewise, in citing the works of others, the [24] intimated that initiatives on the teaching and assessment of 21st century skills originated from the widely-held belief shared by several interested professional groupings like: teachers, educational researchers, policy makers, politicians, employers who reasoned that the current century will demand a very different set of certain generic skills sets and competencies from people in order for them to function effectively at work, as citizens and in their leisure time. These generic skills – range of qualities and capacities are increasingly viewed as important in higher education are distinguished from the discipline-specific knowledge and related technical skills that traditionally are associated with higher education [25]. This is so, as employers want their graduate recruits to be competent technically in their chosen field as well as been well equipped with complementary life skills such as problem solving, reflective and critical thinking, interpersonal and teaming (collaborative) skills, effective communication, character, integrity and high level of personal ethics, self-esteem, self-discipline, organizing skills and abilities to translate ideas to action [26]. Others are – intellectual curiosity; capacities to identify, access and manage knowledge and information; personal attributes such as imagination, creativity and intellectual rigour; and values such as ethical practice, persistence, integrity and tolerance [25]; literacy, numeracy and problem solving in technology-rich environments (2013); and leadership and decision making [27].

2.3 Teams and Teamwork

In the words of [28], traditional model of the Victorian classroom still predominates, particularly at second level in Ireland. Similarly, the reality on ground in Nigeria is that the traditional model of the Victorian classroom predominates all strata of the country's educational system. Conneely et al [28]

maintain that teamwork as a structure for learning is essentially alien to the predominantly didactic and individualised formal 2nd level classroom in their case study situation. The authors of this paper will add that the Nigerian experience at both secondary and post-secondary levels is not any better. On a similar note, engineering education too has traditionally been focused mainly on the formation of professionals who are able to "solve already established problems" Davila in [1]. Similarly, traditional lecture is said to encourage individual study but does not promote important competences demanded by society to graduates Senocak in [27]. It was therefore suggested that, teamwork can be used in university settings to help train students in a large number of skills (generic skills) [6].

Conversely, universities expected to supply industries with graduates not only capable and competent in doing the job as individuals but also who have the required skills to work effectively in a team environment [4]. Therefore, in higher education much effort has been made to find new ways to support individual student learning, but also to find ways for effective collaboration [29]. Conneely et al [28], thus call for a new model of classroom practice and a paradigm shift in teaching and learning is required to allow creativity, peer-peer learning, thematic learning and problem solving, i.e. the skills commonly deemed necessary for the knowledge-based society of the 21st century, to flourish in second level schools (also at tertiary level). They amplified the arguments of previous researchers by concluded that at the heart of any such revised model lies collaboration and teamwork. This position is equally supported by Yip [22], when he argued that the shift in the teaching and learning process be more student-centred than teacher-centred.

Again, because one's ability is finite and restricted, people always need to work with others to accomplish tasks and projects many organizations use team as an autonomous working unit, and it is a must for members to cooperate with each other to get the work done [30]. Consequently, teamwork has become more and more important and essential in the society [30]. It is critical skill required of every individual to function well in this twenty-first Century. It has thus, long been emphasised and recognised as one method that can establish a comfortable and low-threat learning environment in the classroom [9]. Above all, it fosters the development of competences rather than the acquisition of isolated knowledge [27]. Another is that, teams outperform individuals acting alone, especially when performance requires multiple skills, judgments and experiences [30].

Several definitions or descriptions of teams have been advanced in the literature. For instance, Zenun et al [31] described the concept of team as a small number of people with complementary skills who are equally committed to a common purpose, goals, and working approach for which they hold themselves mutually accountable. In looking the corporate organisational settings, [32] referred to team as a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their rela-

tionships across organisational boundaries. The authors went on to describe four different types of teams – work teams, parallel teams, project teams, and management teams. However, since our focus is on classroom setting, the most appropriate team to be considered in this case will be the project team since it is time-limited as is the case with the school settings. Reason is that, outside the walls of the university, most organisations operate via project-oriented teams rather than individuals working in a traditional chain of responsibility [15].

Teamwork in the classroom is also known as collaborative learning or sometimes called cooperative learning (CL). Westbrook [17] broadly defines CL as a pedagogy in which people come together in groups and learn from each other through cooperation. In teamwork environment, each student takes responsibility for the learning of other students in their group as well as their own and they help each other to be successful Gokhale in [19]. It is claimed that during the CL process social interdependence and interaction take place Salomon and Globerson in [10]. Likewise, interpersonal skills, positive attitudes towards group work, and social relationships are also developed [10]. Its positive effects – such as enhancing motivation and critical thinking skills as well as improving academic performance and long-term retention necessitated its wide application in education since 1980s [8], Dillenbourg et al [10].

Widrick (1997) [12] on Team composition is often critical to team performance. However, individual faculty use very different methods for establishing student teams (i.e., students choose their own team, student sitting close together, purposeful teaming, etc.). These methods vary in terms of the heterogeneity of the teams. There has been much discussion on the effects of group heterogeneity on group outcomes.

On other hand, unfortunately, students do not always come away from these experiences with positive attitudes about teamwork and how teamwork relates to effective performance [14], neither do students always perceive collaborative work as positive or successful [7]. Bowen in [30] also corroborated that some studies suggest contrary opinions. Indeed, there are observed drawbacks [6]. For example, participation in student project teams is said to create more frustration and dislike of teamwork than appreciation for the diversity of perspectives and improved learning and performance that it makes possible [30], [6]. This according to them was a result of inevitability of some team members making mistakes and may deny such mistakes and bring about confusion. Another anticipated setback is that, some members may not decide to participate fully in the assigned tasks, but will benefit from rewards all the same. Zou et al [4] listed some of the drawbacks of teamwork thus: different expectation resulting in dissatisfaction of some students; low quality work done by some members; and 'free riders, slackers, members not pulling their weight'; and possible classes and confrontation among group members. Other team problems are: unequal contributions and skills and conflicts in personalities and decision-making [18]. Lastly, how to evaluate individual team members is one of the biggest challenges facing student teams Widrick (1997) [12]. Nevertheless, several other studies have reported that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it

longer than when the same content is presented in other instructional formats [9]. Yau and Cheng [30] agree that previous studies have equally shown that cooperative goal is one of the methods to enhance the problem solving approach which encourages open discussion among group members of their mistakes. For instance, a study by [11] confirmed CL to be enhancing students' interpersonal skills as well as creating a stress-free learning environment. Schmer et al [5] cited a 1991 study of 600 students by Johnson and others, which confirmed student participants as believing that group assignments helped them accomplish more and improved their understanding of major concepts.

3 METHODOLOGY

A mix-methodology was adopted which included extensive desk review of secondary literature consisting of materials gathered from journals, magazines and etc.; a questionnaire; and in-depth interview protocol (IIP). It is conventional to employ either one of two approaches, namely quantitative or qualitative to understand a research problem (Lourens, 2010) [33]. However, researchers can decide to triangulate the quantitative findings by qualitative means. Thus, this study used a descriptive research design with quantitative approach and combined it with a qualitative technique based on the IIP. This was to provide a greater level of confidence of the research results. In the future, focus group discussion may be included.

3.1 The Instrument

The instruments used in this study included a survey questionnaire and an in-depth interview protocol. The first section of the survey questionnaire included demographic information, programmes of study enrolled for, highest academic qualification, gender, etc. See Table 1. The second part was consisted of 20 questions (See Table 2) with all questions requiring on a five point Likert scale, where 1 represented "Strongly Agree" and 5 represented "Strongly Disagree". Such was to indicate students' levels of agreement about statements on how they perceive each of the individual issues raised in the questions, so as to determine their overall teamwork experiences. It included statements such as teamwork helped understanding/comprehension; fostered exchange of knowledge, information and experience; made problem-solving easier; stimulated critical thinking; and etc. Like previous studies, the inconsistent ranking of positive to negative perceptions on the survey was done intentionally to test the consistency of individual student responses. The validity and reliability of the instrument was based on its widespread use by several researchers [8] and others over the years.

The second instrument, the IIP was designed to elicit more information from responded, structured interview questions – similar to that used by [8] – were used in informal situations to interview ten students, though included all three programs, but was randomly distributed. See Appendix A.

Data obtained from the questionnaire was analysed using percentages and data from interviews are presented qualitatively. Results are presented in tables, charts and histogram

TABLE 1
DEMOGRAPHIC DATA FROM SURVEY RESULTS

Demographics	
Sample Size	30
Number of Responses	19
Response Rate	63.3%
PhD Students	6
MSc/MEng Students	13
Male Students	18
Female Students	1
Engineering Management Program	6
Technology Management Programme	10
ICT Management	3

3.2 Limitations of the Study

Participants were obtained from one university setting and the small sample size (N=19) small number of participants limits the generalizability of this study. Another limitations was that, the METI Programme is a special collaboration between the University of Pretoria and the University of Port Harcourt and therefore runs like an hybrid engineering and technology management programme and not the like the regular science and engineering programmes of the University of Port Harcourt.

4 RESULTS

This studies aim is to identify the graduate students' perceptions of teamwork. 19 questionnaires were returned out 30 that were given out, accounting for a high recursive rate of 63.3%. All respondents answered all the questions in the questionnaire. There was only one female student in the class who also returned her completed questionnaire.

4.1 Survey Results

The results in Table 3 (see Appendix B) show the combined responses in figures and percentages. The "Agree" and "Strongly agree" responses are combined and presented here as "Agree" responses. Likewise, the "Disagree" and "Strongly disagree" responses are combined and presented as "Disagree" responses.

From the results obtained as shown in Table 2 and Table 3, it can be seen that all respondents agree that teamwork helped understanding (100%); fostered exchange of knowledge, information and experience (100%), fostered team spirit (100%); and should be encouraged and continued (100%).

Closely following the above is that, 18 out of the 19 respondents agree that they got fresh insights, teamwork was focused on collective efforts rather than individual effort, and it improved performance as well as making new friends.

Respondents, (89.47%) also agree that teamwork stimulated critical thinking, enhanced communication skills, and that they actively participated in the teaching/learning process. Others were, 84.21% of participants agree that teamwork made problem solving easier, also enabled learners to help weaker team members. Whereas, 15 respondents agreed it was fun working in teams, 13 of them agreed they received useful

feedback and that they were greatly responsible to themselves and the team.

Only a smaller percentage of respondents (63.16%) agree that maximum of number of team members should four.

It was interesting to find that 73.68% (almost three-quarter) of respondents agree that it was not a waste of time. And 52.63% (about half) of the respondents that agree it not difficult getting members to participate in tasks.

Taking the example of Browns [8] study, and for purposes of clarity of analysis, the items in the questionnaire (as shown in Table 4) were further categorized as: a) academic benefits, b) social benefits, c) generic skills, and d) negative aspects of teamwork. Items 1, 2, 6, 7, 10, 12, and 13 represent academic

TABLE 4

PERCENTAGE COMBINED STUDENTS' RESPONSES BY CATEGORIES

Category	Agree	Disagree	Unsure
Academic Benefits	90.23	0	9.97
Social Benefits	78.95	0.03	21.02
Generic Skills	87.72	0.01	12.27
Negative Aspects	13.19	63.16	23.65

benefits; items 5, 14, and 15 as social benefits; items 3, 4, 8, 9, 11, and 16 as generic skills; and items 17 and 18 represent negative aspects of teamwork. Items 19 and 20 were not included. Students' responses by categories are displayed in percentages in Fig. 1.

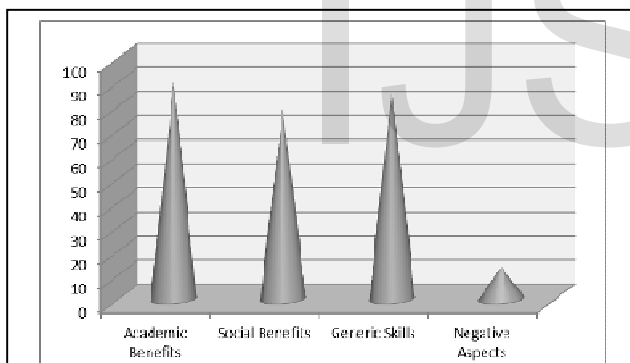


Fig1. Percentage Combined Agree Responses by Categories

Fig. 1 above shows that a large percentage of students agree that they stand derive academic benefits from teamwork, acquire generic skills draw out social benefits in the process.

Meanwhile, Fig. 2 below shows that the highest number of students disagreeing the responses was on the negative aspects of teamwork. It means that the three other categories were approved by the respondents.

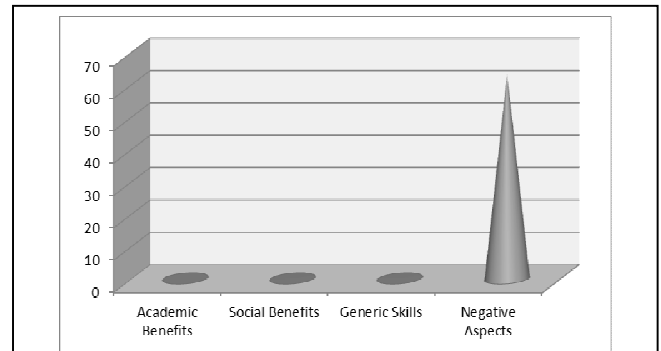


Fig 2. Percentage Combined Disagree Responses by Categories

From Fig. 3 below, it can be seen that over 90% of respondents agree that teamwork improves academic performance as they are sure to derive academic benefits from it. Close to 88% percent of respondents agree that teamwork enables students acquire generic skills. Also, nearly 80% of students agree that social benefits too can be derived from participating in teamwork. Lastly, a little more than half of the students (63.16%) disagree regarding the negative aspects of teamwork.

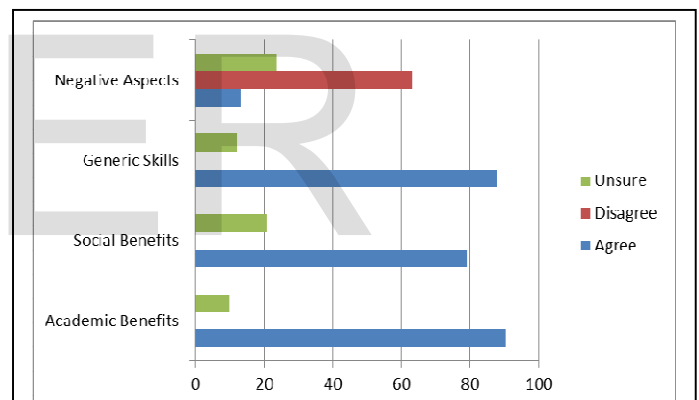


Fig3. Agree, Disagree and Unsure Responses by Categories in Percentage

4.2 Interview Results and Discussions

The number of persons interacting in collaborative learning could matter. Most of the respondents interviewed participated in group that is made of 4 persons and the members were assigned to the group by the lecturer. There were also observed benefits to teamwork. Respondents affirmed that teamwork facilitates sharing of knowledge as each member could see the topic of discussion from a different perspective depending on his/her educational background and training. They also agreed that working in a team gives members sense of responsibility and team building.

There were divergent views as to how roles were assigned in group engaged in teamwork. Some respondents stated that team members agreed and assigned roles to members while one respondent stated that members of his own group volunteered to play specific roles. Another respondent stated that leadership

emerges in group when that person who fill he/she has the capabilities opts to take up and roles were likewise assigned to group members based on perceived abilities individual team members.

The assignment of a task to members of the group could yield results or affect the overall performance. Most of the respondents believed that team building facilitated proper analysis of the tasks or issues being discussed but complained that deadlines were not met some times. Some members do not complete tasks assigned to them on time, and some contributions from the team members were considered not good enough.

The role of the academic staff could be to write the guidelines for participating in group or team work. This is was the view of one of the respondents but another respondent felt that there should be assessment of the individuals before assigning them to groups to ensure that the team members complement each other. Some participants suggested that lectures provide more opportunities for teams to work in class as this will increase the chances of success.

It was obvious that teamwork could have its problems and respondents stated that they ensured that each members participated by making his/her own contributions. One respondent stated that problems were better handled when members of the group were willing to help out members with discordant views.

All respondents agreed that they were better off learning in a group than doing it alone. They were able to see differently when each member shared his own view. More so they believed that they will be much willing to engage in future collaborative learning. Some respondents noted that they felt that they will increase their contributions and level of participation in the group learning exercises. One stated that he was willing to volunteer without waiting to be nominated to perform a task. He agreed that he now has more confidence to participate in group work than before.

4 DISCUSSIONS

Returning to the main research questions that was aimed at identifying postgraduate students attitudes and experiences toward teams, improving team formation procedures and findings ways of better managing teamworks in the schools; the results indicated that students who participated in the study reportedly agree to three clusters of perception variables – academic benefits, generic skills and social benefits. Participants therefore expressed to readiness to participate in future group works. However, participants disagreed with the negative aspects of the study.

There was a close similarity between the results obtained from the survey and that of the IIP. Interviewees corroborated most of the items scored in the scored. They also made some useful suggestions as to how lecturers should facilitate team formation and provide guiding principles of team engagements.

To a large extent, findings from this study are not in any-way different from previous students. Like other studies, this finding provides an excellent starting point for instructors who want to encourage positive group experiences in their

classrooms and increased teaming skills for their students. This supports earlier works [14], [15], [20], [25].

5 CONCLUSION AND RECOMMENDATIONS

The four research questions that the study aimed to address were resolved as analysis data for the most part confirmed findings from the literature on teamwork and CL. It was established that student who participated in teamwork, in addition to acquiring the most sort for 21st century skills – communication skills, problem solving, analysis and teamwork skills, leaderships skills, they equally derived academic benefits – increased performance, and social benefits as well. We conclude with the words of [6] that since the work of lecturers is to form as much as possible, best attitudes and aptitudes in students, like [14] advocated, educators should devise pedagogical tools to facilitate or may support the development of this competence of teamwork.

7 APPENDICES

Appendix A. Table 2

TABLE 2
SUMMARY OF RESPONSES TO 20 SURVEY QUESTIONS USING 5 POINT LIKERT SCALE

S/N	Survey Question	% Strongly Agree	% Agree	% Unsure	% Disagree	% Strongly Disagree
1	Help understanding/comprehension	26.3	73.7	0	0	0
2	Fostered Exchange of Knowledge, Information and Experience	42.1	57.9	0	0	0
3	Made problem-solving easier	26.3	57.9	15.8	0	0
4	Stimulated critical thinking	31.6	57.9	10.5	0	0
5	More relaxed Atmosphere	26.3	36.8	31.6	5.3	0
6	Received useful/helpful feedback	21.1	47.4	26.3	5.3	0
7	Gave me fresh insight	26.3	68.4	5.3	0	0
8	Focused on collective efforts rather than individual effort	31.6	63.2	0	5.3	0
9	Gave me greater Responsibility for myself and the group	15.8	52.6	31.6	0	0
10	Enabled learners to help weaker learners in the group	36.8	47.4	15.8	0	0
11	Enhanced communication skills	36.8	52.6	31.6	0	0
12	Improved performance	21.1	73.7	5.3		
13	Helped learners actively participate in the teaching/learning process	31.6	57.9	10.5	0	0
14	It is fun	31.6	47.4	15.8	5.3	0
15	Made new friends	57.9	36.8	5.3	0	0
16	Fostered team spirit	57.9	42.1	0	0	0
17	Waste of time explaining things to others	0	10.5	21.1	31.6	36.8
18	Difficulty getting members to actively participate in tasks	0	26.3	21.1	31.6	21.1
19	Pair/group work should be encourage/continued	78.9	21.1	0	0	0
20	Maximum group size should be four	31.6	31.6	31.6	0	5.3

Appendix B. Table 3

TABLE 3
COMBINED STUDENTS RESPONSES

Q.	Description of question	Agree	Disagree
1	Helped understanding/comprehension	19 (100%)	0 (0%)
2	Fostered exchange of knowledge, information and experience	19 (100%)	0(0%)
3	Made problem-solving easier	16(84.21%)	0(0%)
4	Stimulated critical thinking	17(89.47%)	0(0%)
5	More relaxed atmosphere	12(63.16%)	1(0.05%)
6	Received useful/helpful feedback	13(68.42%)	1(0.05%)
7	Got fresh insight	18(94.74%)	0(0%)
8	Focused on collective efforts rather than individual effort	18(94.74%)	1(0.05%)
9	Greater responsibility – for myself and the group	13(68.42%)	0(0%)
10	Enabled learners to help weaker learners in the group	16(84.21%)	0(0%)
11	Enhanced communication skills	17(89.47%)	0(0%)
12	Improved performance	18(94.74%)	0(0%)
13	Learners actively participated in the teaching/learning process	17(89.47%)	0(0%)
14	It was fun	15(78.95%)	1(0.05%)
15	Made new friends	18(94.74%)	0(0%)
16	Fostered team spirit	19 (100%)	0
17	Waste of time explaining things to others	1(0.05%)	14(73.68%)
18	Difficult getting members to actively participate in tasks	5(26.32%)	10(52.63%)
19	(pair/group work) should be encouraged/continued	19 (100%)	0
20	Maximum group size should be four	12(63.16%)	1(0.05%)

Appendix C. In-depth Interview Protocol

1. How many were you in a group when you were engaged in collaborative learning?
2. How was the group organised (e.g. by lecturer, self-select, etc)?
3. Considering your experiences of teamwork, what, if any, were the academic benefits?
4. What, if any, were the social benefits?
5. How were 'roles' assigned or did group members have equal status?
6. What worked well and what didn't?
7. What role do you think academic staff should play in preparing students for collaborative learning?
8. How did your group deal with problem or problem members, if any?
9. Do you feel that you learned more as part of a group than you would have, working on the same assignments /projects individually?
10. Is there anything you would change about your own behaviour or approach in future collaborative learning situations?

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