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# The Role of the Facilitator Using Group Work in a Systems Analysis Course

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# THE ROLE OF THE FACILITATOR USING GROUP WORK IN A SYSTEMS ANALYSIS COURSE

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## ABSTRACT

Group work encourages creative thinking and provides more efficient problem-solving approaches. The main problem identified in this paper is that students involved in systems analysis courses on tertiary level, struggle to apply theory to real-time situations and find it difficult to generate appropriate modelling solutions. The purpose of this study is to determine whether group work is an effective means to use in the teaching of a systems analysis course, and whether it will improve the effectiveness of how students acquire knowledge of the course content. The perceptions of both facilitators and second year Informatics students were recorded by means of interviews and questionnaires used respectively. It was found that group work positively contributes and adds immense value to the learning experience of students taking a systems analysis course.

**Keywords:** Group work, Systems analysis, Learning style, Learning preference, Facilitator

## I. INTRODUCTION

There is a shift in education preference from individual learning to group work related to a confirmation of tertiary education, and students need assistance in understanding and translating the composite world in which they live in

today. Houdsworth *et al.* [2000] observe that group work have become an integral part of various undergraduate courses over the last decade. Group work research is still an emerging field to be studied, as there is doubt on various central group procedures and different meanings attached to many aspects of group work. Houdsworth *et al.* [2000] supportively state that it is an emerging field, as there is a great deal of ambiguity and uncertainty regarding many fundamental aspects of group processes. Johnson *et al.* [1998] state that group work research has been conducted over an extensive period of time, involving various institutions in many countries.

De Grave *et al.* [1998] further imply that research related to the facilitator's behaviour, had a clear focus on the skilfulness of the facilitator and the effects this has had on students' performance. An interesting aspect is that the facilitator's behaviour is not covered in group work or theories explaining under what circumstances group work will be effective.

For the remainder of this paper, the terms "lecturer" and "facilitator" are seen in the same context by the researcher. Thus the lecturer and the facilitator are viewed as one and the same individual.

The purpose of this study is to determine and explain whether applying group work in the teaching of a systems analysis course on second year undergraduate level, will improve the effectiveness of how university students acquire knowledge of the course content. What is group work, and how can this teaching method be applied in a tertiary education environment, to improve the effectiveness of learning the content of a second year systems analysis course?

Individual and collaborative learning among students have been compared in many research studies, but as noted by Yazici [2005], "graduate students may be more responsive to individual responsibilities within a group, therefore performing well", and these students are inclined to be group learners and perform better in group work assignments. A study was conducted on group projects with the following findings by Arango [n.d.]: "I feel the students were

more deeply involved in, and engaged with the course content. They also develop a better understanding of the human interaction in group processes based on individual personality styles."

There are many advantages of incorporating group work when teaching in the Information systems field, thus expanding the need for research on this topic, because of the greater effect and contributions it will have on the teaching of systems analysis courses in the future.

## II. RESEARCH QUESTIONS

A problem underlying group work is that no sufficient provision is made by facilitators for individual learning styles and preferences in a large class environment. How should facilitators use group work? Do facilitators take different learning styles and preferences into consideration? Do facilitators feel that they are adequately trained to manage group work situations? What do facilitators see as advantages and disadvantages of students working in groups?

Scheepers [2000] implies that facilitators need to realise that "every learner is a unique individual with unique characteristics", and Chen [2004] states that in order for facilitators to provide adequate support to students, it is critical for him/her to understand and acknowledge the interaction among them. Individuals differ in the way they approach group work. "Learning style preferences can explain why some team members procrastinate, while others are more competent" [Yazici, 2005].

## III. RESEARCH METHODOLOGY

The researchers will be taking on an interpretive approach and remain subjective to the study. The researchers believe that the world is socially constructed and humans are influenced by situations around them, and they are aware of change in their environment. There is a need to gain a clear understanding of the phenomenon being studied. The study of people in their natural settings and a high level of interpretation also support this approach.

The research perspective will be qualitative, because of the interpretation of the students' information to determine and understand their perceptions of the effect of group work on the course, and to understand group work from the perspectives of the lecturers.

## IV. LITERATURE REVIEW

Projects are very popular in Information systems courses, especially in the second and third year of study. These projects support the evolvement of various skills, such as working in groups; solving problems; making decisions; interpersonal communication and time management skills [Smith, 2004]. Systems analysis is problem based, and this is a good enough reason to explain why students benefit from group work or problem-based learning (PBL) in the form of tutorial sessions where they can share ideas and make sense of the subject content. Johnson *et al.* [1998] argue that when students learn together and discuss theory, their individual performances increase. Blumenfeld *et al*. [1996] express a similar view that when students share their approaches, discuss their findings and points of view while taking risks, the outcome of the level of understanding and knowledge is much higher than when a student works individually. This is also because systems analysis requires deep thinking patterns and negotiation skills, which group work provides.

Different teaching methods are used for variable purposes, depending on which method will best suit a specific situation. One of the best methods to practice knowledge is the use of tutorials [Patel, 2003]. In many cases of teaching a systems analysis course, students listen and make notes during the lecture, and certain areas are then further discussed in the form of small group tutorials. Student learning is positively influenced by the use of tutorial groups, which promotes better intrapersonal and communication skills. Respective studies point out that students' cognitive ability is positively affected and a higher level of interest in the course content is apparent [Bonanno *et al.*, 1998 and Dolmans *et al*., 2001].

From the researcher's perspective and experience, tutorials are sessions of intense interaction between a small number of students with the guidance of a facilitator. Tutorials supplement the information encountered in the traditional lectures. Group work is work conducted between two or more individuals, interacting and sharing knowledge to achieve a specific goal, and it may involve activities undertaken during lectures and are usually carried out in class time, where tutorials are conducted outside of normal classroom times.

Many tertiary institutions are becoming aware of the advantages of tutorials, and are involving their students in this type of learning, because they realise that group work in tertiary education is an efficient way to learn, elevating useful skills, and that group work improves social interaction among students where they are encouraged to cooperate and interact [Burdett, 2003 and Potter, 1997]. Group work in Information systems aligns hard and soft skills, which contends to the workforce in how practice emphasises group work as a crucial activity [Smith, 2004].

Group work has many other positive outcomes related to students. They:

- are equipped with improved thinking skills
- obtain better academic results
- have a well-established self-esteem
- possess better adaptability skills among peers
- have greater continuity and retentiveness regarding the content of the subject
- are equipped with higher-order thinking capabilities
- can better integrate information
- have an improved accommodation of peers' views and learning methods

[Blumenfeld *et al*., 1996 and Towns *et al.*, 2000].

## INDIVIDUAL LEARNING STYLES AND PREFERENCES

Learning styles can be defined as an academic way in which students express their personalities, and it's also about a learner's level of motivation

and type of attitude [Tickle, 2001]. Learning styles are defined by Cassidy [2006] as approaches to learning tasks, taking characteristics of learners into account. Another definition for learning style is that it is the method a learner adopts to concentrate, transform, and take in new and complex information. It is also a procedure of inherent attributes such as extraversion [a person's view of the outer world] and introversion (a person's view of the inner world) [Boström *et al.*, 2006 and Hendry *et al*., 2005]. Sadler-Smith [1996] explains a learning style as "a distinctive and habitual manner of acquiring knowledge, skills or attitudes through study or experience", and Yazici [2005] elaborates on the explanation by stating that "learning style refers to a learner's pattern of behaviour in approaching a learning experience: taking in new information, developing new skills, retaining new information and applying new skills to life situations".

More educators are becoming aware of learning style implications, and find ways to promote students to adopt a meta-cognitive approach. They explain learning processes to students and broaden their knowledge on different approaches and aspects of learning. They also realise that different techniques can be developed for the classroom to take students' individual differences (especially learning styles) into consideration, and to raise the performance level, such as higher achievement, improved content retention, better attitudes, and to equip them with the ability to understand the importance of learning [Evans *et al.*, 2006 and Boström *et al.*, 2006]. Knowledge about and awareness of different learning styles enhance learning, for facilitators as well as students, and the persuasion of learning styles differs from experience in education and gender [Yazici, 2005]. Yazici [2005] further contends that research indicates that the facilitator should choose activities that are similar to students' learning preferences, and they should realise the worth of diverse learning styles in groups.

Felder *et al.* [n.d.] describe four categories of learning styles:
a) Active and reflective learners:

Active learners tend to retain and understand information best by doing something active with it; that is discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.

b) Sensing and intuitive learners:

Sensing learners tend to like learning facts; intuitive learners often prefer discovering possibilities and relationships.

c) Visual and verbal learners:

Visual learners remember best what they see, for example pictures, diagrams, flow charts, time lines, films, and demonstrations. Verbal learners get more out of words--written and spoken explanations. Everyone learns more when information is presented both visually and verbally.

d) Sequential and global learners:

Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly "getting it".

Cassidy [2004] explains Entwistle and Tait's model, which has been used frequently in tertiary education. Depending on the learner's orientation, four approaches to learning are described:

a) apathetic: the learner has a lack of interest and direction
b) strategic: the learner adopts organized study methods, use time well, is aware of evaluation requirements, and is a fast learner
c) surface: the learner is afraid of failure, has the intent to reproduce, and makes use of unrelated and passive learning
d) Deep: the learner has a need to understand and interrelate ideas, and make use of evidence and active learning.

The Dunn model, on the other hand, describes learning styles for each type of learner. This model indicates that every individual has their own learning preferences and strengths, and students learn better by using their own learning style [Pheiffer *et al.*, 2005].

A very well known model in which many practitioners and researchers have shown an extensive amount of interest in is Kolb's experiential model [ELM]. This model was based on Jung's construct of types where high level interaction, integration and construction of non-dominant styles assist in achieving development [Loo, 2004].

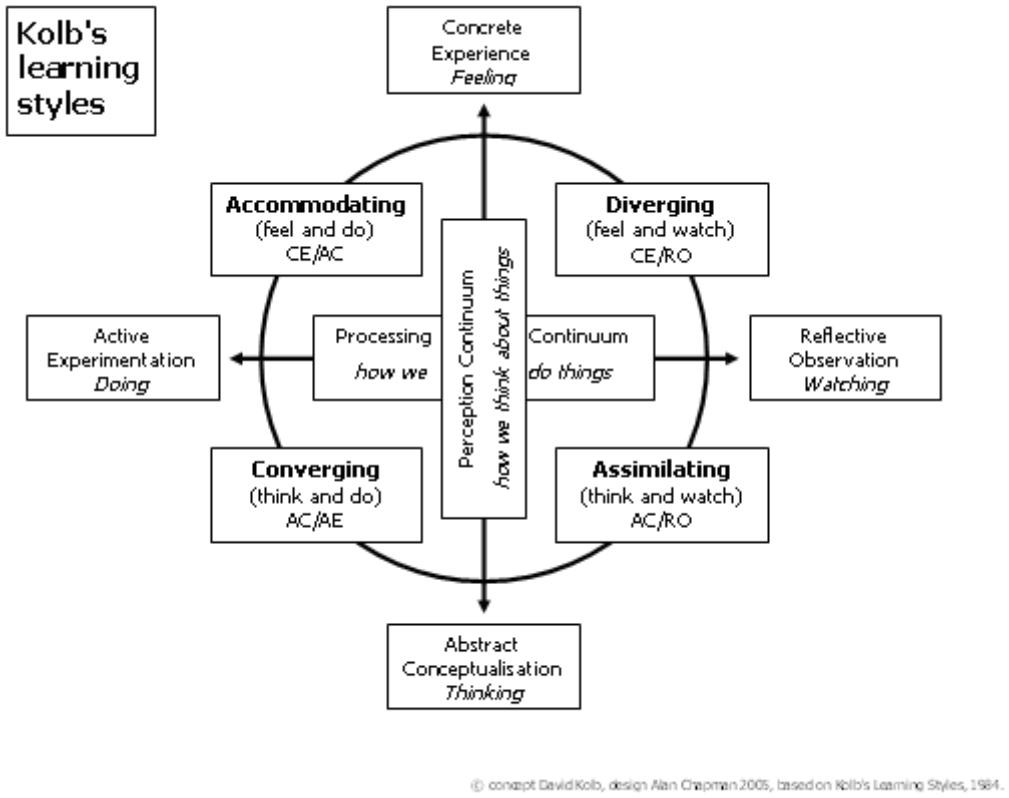


Figure 1. Kolb's two-dimensional learning model and four learning styles

Kolb's model explains two dimensions which are independent of each other. The first is the 'concrete experience-abstract conceptualisation perceiving dimension', and the second is the 'active experimentation-reflective observation processing dimension'. Four quadrants, formed by these two dimensions, show four learning styles:

a) Accommodator

Accommodators mainly learn from concrete experience and not from logical procedures. They usually go with their intuition and prefer active experimentation. They can easily adapt to change [Buch *et al.*, 2002 and Loo, 2004].

b) Diverger

Divergers can adopt many points of view and observe situations in a reflective matter. They have good imaginations, are good listeners, open-minded, and their values are important to them. They are also sensitive to other people's emotions and good at group sessions [Buch *et al.*, 2002 and Loo, 2004].

c) Assimilator

Assimilators have good thinking skills, are able to put information in an ordered form, and can express much in a few words. They can take in and understand a lot of information, and are less concerned about human issues. They prefer learning from 'paper', and resist computer-based learning the most [Buch *et al.*, 2002 and Loo, 2004].

d) Converger

Convergers can easily transform ideas and theories into practical applications, thus they are good at experiments. They are good at making decisions, and prefer working with technical rather than social issues. They have the strongest preference for computer-based learning [Buch *et al.*, 2002 and Loo, 2004].

A learning preference is a particular learning or teaching technique, an aggregation, or the best method or structure which a student prefers, and can be seen as in the middle of the outside learning environment and inner world. Through the chosen learning preference, the student tries to cope in the learning environment to increase his/her knowledge [Ellison *et al.*, 2005 and Sadler-Smith, 1999]. Factors such as gender, age, area and experience level of learning is known to have an influence on an individual's learning preferences. Learning preferences demonstrate different preferred methods of learning, for example independent learning vs. dependent learning; group work vs. individual learning; and other preferred instruments used. If the facilitator ignores these preferences, the students' level of motivation and participation will be affected negatively, in return affecting the learning process as a whole [Evans *et al.*, 2006].

The following table lists the learning preference types from three different researchers' perspectives.

Table 1. Learning preference comparison

| Learning preference comparison | | |
|---|---|---|
| **Sadler-Smith [1999]** | **Ellison *et al.* [2005]** | **Loo [2004]** |
| Dependence | Competitive | Active |
| Collaboration | Cooperative | Reflective |
| Independence | Individualistic | Individual |

Extensive research has been conducted on the relationship between learning preferences and learning styles, in order to customise teaching methods to suit students' preferences [Loo, 2004]. Loo [2004] further suggests that learning style does not determine learning preference, evident from individual differences residing in each learning style. Boström *et al.* [2006] explain the positive association between adapted methods to the learning style and a student's motivation. They state that students learning while using their preferred method are more successful, and that students can improve the learning experience if they elaborate on their preferences. They also contend that facilitators can use tasks covering one or more than one preferences which will cause a higher success rate among student learning. Knowledge about individual preferences can equip lecturers with valuable information. Lecturers deal with diverse groups, and sometimes they have to personalise class activities to motivate students who are unresponsive to certain methods of teaching. It is important for lecturers to identify different needs and to plan their approaches accordingly to ensure efficient interaction among students [Gilbert, 1999].

## THE USE OF GROUP WORK BY FACILITATORS

The word 'facilitate' originates from a Latin word *facilis* which means 'to make easy'. A facilitator assists groups in improving their problem-solving and decision-making skills for increased effectiveness of processes and task completion, which in return is known to be the goal of facilitation [Bentley, 1994 and Kolb, 2004].

Yazici [2005] contends that the overall goal of facilitation is to foster independent behaviour among students, and to provide direction for the realisation of individual responsibility for learning. Bentley [1994] supports this

by stating that the facilitator's role is to empower students to take individual responsibility for the learning experience.

Issues related to group processes and interactions occupy facilitators. The interaction between the facilitator and student is a social activity that should support the student's needs in terms of social interaction, personal characteristics and a professional relationship [Kolb, 2004 and Patel, 2003]. Group work can either be used correctly or incorrectly. Students will not automatically cooperate in an assigned group, because there are many aspects which need to be taken into consideration before assigning students to groups [Blumenfeld *et al*., 1996 and Johnson *et al.*, 1998].

Facilitators are becoming confused about exactly what is required from them when using group work. Sometimes they have to lead the class, give suggestions, or just be present if their expertise is needed at some stage [Kolb, 2004]. It is important for the facilitator to be a good listener and to create a safe environment in which conflict can arise and be resolved in a supportive manner [Bentley, 1994].

Problem-based learning (PBL) is another term for an application of group work, where students are required to discuss a given problem in groups. PBL involves finding appropriate solutions to problems and cases, and this is exactly where the facilitator is needed. The facilitator affects how the groups function, as well as the group of students' prior knowledge and experience of the content [De Grave *et al.*, 1998 and Kolb, 2004]. PBL helps rebuild a student's knowledge when interacting in a tutorial group, enhancing the development of students who are able to use voluntarily assumed standards to expand the knowledge base [Dolmans *et al.*, 2001].

According to Bentley [1994], the facilitator should suggest a certain direction to get students involved in group work. To make sure that the focus remains on group needs, the following is essential to achieve this. The facilitator should allow the group to go in a direction they want to; should be continuously aware of group activities and progress; and should pay attention

to individual needs within the group. Persuasion is also not the best approach to offer leadership. It is better to lead by example and to assist and interfere when necessary [Bentley, 1994].

Many research papers focus on a student-centred approach to learning [Evans *et al.*, 2006]. This means that the students are responsible for interaction and solving the problems cooperatively, and they obtain results together. Group work highlights knowledge as a social construct and an approach that is student-centred rather than lecturer-centred [Chen, 2004 and Evans *et al.*, 2006]. The facilitator's role differs from that of the traditional lecturer, because the students are more responsible for learning, which is referred to as student-directed or student-centred learning [De Grave *et al*., 1998 and Dolmans *et al*., 2001].

Group work can cause many problems to arise for the facilitator, and too often the facilitator choose a personally preferred teaching option, referred to as a lecturer-centred approach, in which the responsibility of learning depends on the facilitator's actions [Dolmans *et al.*, 2001]. Dolmans *et al.* [2001] further explain that if faced with a lecturer-directed or lecturer-centred approach, it means that responsibility for learning is either placed with the facilitator or one single student.

The facilitator should take certain factors into consideration for group work to be a success. He/she should offer guidance and assistance to the students as they try to solve problems, manage good interaction between group members, show commitment to the learning process, and provide problems which comply with their past experiences and knowledge to ensure efficient discussions, to avoid tiresome content [De Grave *et al*., 1998 and Dolmans *et al*., 2001]. Facilitators need to accept the fact that many issues are beyond their control when group work is considered, which in return doesn't ensure facilitating to always be correct and without mistakes. However, it is possible for facilitators to arrange the activities in such a matter, that at some stage nearly every student can perform at his/her best, because of a certain preference or style accommodated, and not just the style used as preferred by

the facilitator. This ensures that students are continuously motivated [Chen, 2004].

Chen [2004] contends that there are two important responsibilities of facilitators. Firstly, they have to plan and design activities that will foster group work skills. Secondly, facilitators have to give continuous support for students facing group work challenges. Facilitators should design group work effectively and be proactive in regard to potential problems. The facilitator shouldn't provide groups with a right answer, or point out if a student is correct, but rather intervene at a minimal instruction level. The facilitator should only redirect groups into the right direction and should observe the groups' status, for example, observing if certain group members are not participating [Blumenfeld *et al*., 1996 and Chen, 2004].

Johnson *et al.* [1998] state that the facilitator has to take group size as part of group composition into consideration, determine the necessary materials for the assignments, and the infrastructure of the room. The facilitator should also explain the expectations for the lecture/tutorial, and monitor progress and interrupt where necessary to be of assistance. Facilitators also need to carefully plan activities to meet their own goals, plan on how evaluation will be conducted, and promote group norms to lay out the rules for behaviour among group members. The facilitator should promote social skills among students, and find correct ways of holding each member accountable for the learning experience [Blumenfeld *et al*., 1996 and Houdsworth *et al.*, 2000].

Soller [2001] supportively states that good facilitators equip their students with cognitive skills to learn the content, and social skills to improve communication between members and groups. De Grave *et al.* [1998] consider cognitive and social congruence as important factors in student learning. Cognitive congruence is the ability of the facilitator to be sensitive to the students struggling with problems and to empathise with students knowing the challenges they have to face, and social congruence, which is a necessity for cognitive congruence to occur, involves students having knowledge to understand the content of the subject and other interpersonal characteristics.

Evans *et al.* [2006] explain various guidelines which will ensure enhanced learning:

a) Provide students with a degree of flexibility and choice of teaching methods and better course design.
b) Use teaching instruments which most learners prefer, and broaden their styles and traditional learning methods
c) Create a positive environment, provide feedback and explain evaluation methods and state the goals for each lesson
d) Do not label or judge certain students
e) Vary teaching methods to suit almost all learner types
f) Be aware of cultural differences and manage the environment
g) Compose groups to advance group diversity

The facilitator needs to carefully plan how the groups will be evaluated. He/she should evaluate the students' work on a regular basis, or make use of peer evaluation or self-evaluation, depending on the type of task completed. When using peer evaluation, the facilitator should design it in such a manner that students will be honest about contributions by other group members [Dolmans *et al*., 2001 and Houdsworth *et al.*, 2000]. The facilitator can also use rewards for group performance. An advantage of this is that students achieve more from group work, but only if the rewards are based on members' individual learning. A disadvantage of this is that the focus is directed more on achievement in the form of marks, rather than the learning experience itself adding value to the student's knowledge base. Rewards based on group competition are usually damaging to student relationships [Blumenfeld *et al*., 1996 and De Grave *et al.,* 1998].

Burdett [2003] argues that it is extremely difficult for the facilitator to award marks for the contribution of each group member, because the true contributions of each member is unclear to the facilitator except if members complain about another member not contributing equally. It is the group who understands the contributions made by members. Blumenfeld *et al*. [1996] further contend that interpersonal relationships between group members are negatively affected if there is one grade for each group. Those groups whose

performance was poor, are unsatisfied, and tend to blame low-ability students for the poor performance. The facilitator should design appropriate evaluation techniques fostering honest feedback on group achievement and contributions made without negatively impacting social interaction [Houdsworth *et al.*, 2000].

## THE CONSIDERATION OF LEARNING STYLES BY FACILITATORS

There is a growing need for facilitators to take different learning styles into consideration when conducting group work, as an awareness of the different styles will increase the effectiveness of the learning process and will cause the evolvement of competent learners and knowledgeable facilitators [Buch *et al.*, 2002 and Sadler-Smith, 1996].

The different learning preferences and styles of students cause many challenges for facilitators. Facilitators should remember that it is not possible that all students' performance will achieve maximum efficiency at the same time, and the preference of some students will be met, while the other students' preference will not be met [Pheiffer *et al.*, 2005 and Evans *et al.*, 2006 and Webb *et al.*, 1998].

The facilitator should recognise each student's preferred learning style, and not discourage the student's choice, to develop self-confident learners taking part in critical thinking. There is no one right way to learning, but only the knowledge to teach and evaluate students appropriately [Pheiffer *et al.*, 2005]. Facilitators should use various learning approaches and motivate their students to be open to different approaches, rather than viewing an approach as linked to a certain learning style [Loo, 2004].

Facilitation should cater for diversity in learning preferences [Yazici, 2005]. Sadler-Smith [1996] supportively states that "knowledge of personal styles within the suggested framework may also be used to facilitate more effective group working". If facilitators are more aware of learning preferences and styles, a framework can be acquired to support training development for facilitators.

## FACILITATOR TRAINING

How should facilitators be trained to use group work effectively as a teaching strategy? Managing group work is a complex task and entails more than just the facilitator's presence. Facilitators need training for different reasons. They need to identify learning styles and adapt the learning process accordingly, and they have to provide useful feedback [Evans *et al.*, 2006]. Facilitators are experiencing pressures to make group work a success and develop competent students. There is an increasing emphasis on the development of facilitators [Bonanno *et al.*, 1998].

De Grave *et al.* [1998] describe that a limited number of studies have pointed out the important attributes for the facilitator to improve students' learning, and Prichard *et al.* [2006] supportively state that limited research has been done to explore the effects of training on group work in a University setting.

The use of group work for undergraduate students' development of skills causes many difficulties for facilitators who don't receive the necessary training for skills or experience in group work. It also highlights the issue of inadequate facilitators having to cope with these issues while trying to make a success of group work [Bonanno *et al.*, 1998]. Kolb *et al.* [2002] notice hat it will be useful to have activities related to facilitator training and development in place, to assist them in preparation, planning and organisation of group work.

Kolb *et al.* [2002] identify ten competencies for group facilitators which need to be linked to training. The facilitator should:

- be an active listener
- use appropriate questions
- monitor the group dynamics efficiently
- rephrase short content sections
- stimulate creativity
- provide adequate feedback
- act neutral; prepare follow up activities

- make use of effective humour
- Make use of the most appropriate technology and visual aids.

De Grave *et al.* [1998] describe four crucial properties related to the behaviour of the facilitator, which also need to be linked to training. These include exhilarating improvement; providing direction for the learning process; exhilarating integration of activities, interaction between student and facilitator and between students, and stimulating student accountability as individual.

## ADVANTAGES AND DISADVANTAGES OF GROUP WORK – THE FACILITATOR

What do facilitators see as advantages and disadvantages of group work? Facilitators are aware of the advantages and disadvantages of group work, and for those with an extensive amount of experience in group work, the level of understanding of these aspects is increasing.

Group work has many disadvantages. It may cause ritual behaviour, and often has a discouraging effect on students involved in tutorial groups, which affects their level of participating actively. Ritual behaviour occurs when students appear to be dynamically involved in the tutorial, for example, when one group member hasn't thoroughly prepared individually before the tutorial session. This will have an effect on the group as a whole [Dolmans *et al.*, 2001]. A problem related to ritual behaviour, is that the student doesn't prepare before the session, thus causing the facilitator to turn the tutorial session into a lecture to explain the work, which is not the objective for the tutorial. This causes the students to stay dependent on the facilitator, and limits the students to mature as competent learners [Dolmans *et al.*, 2001 and Chen, 2004].

Involving students in group work is not a guarantee that they will work together effectively. A problem, which often surfaces in group work, is unequal contribution by members of a group, and there is essential proof that group members don't interact on a social level. Further, students often withdraw or

observe in silence in the fear of other members seeing them as incompetent to participate or contribute [Blumenfeld *et al*., 1996].

Burdett [2003] explains more reasons why group work is viewed in a negative manner. These include group evaluation methods; competition among group members and other groups; group kinetics; and inadequate organisation of groups. Burdett [2003] also describes two reasons why group work may be unsuccessful. Firstly, group kinetics is sometimes very complex when students are required to use their cognitive and social interaction skills, which might be in an immature phase. The result is that students don't always welcome this new approach, and might show rejection. Secondly, the university setting is a highly competitive environment in which students have to cope, and different evaluation methods make some students uneasy, because they fear being graded in an unfair manner.

Despite all the disadvantages, there are various advantages related to group work. Deep thinking skills are challenged and developed by group work, and it encourages students to take part in the learning process. Students invent and share new ideas with other members of the group, which is a vast advantage [Bonanno *et al*., 1998 and Burdett, 2003]. Facilitators find the work content and lessons more fun, easier manageable, and they realise the value of group work to the students. The group work sessions also occur outside the normal lecture times, which eliminate the time constraint. Facilitators also find that their workload is not extensively affected in terms of marking, and their students develop excellent communication and interaction skills, as well as good experience for working in groups [Bonanno *et al*., 1998 and Potter, 1997].

Advantages of working in a group are purposeful involvement and participation in activities, face-to-face interaction, reinforcement of skills previously taught, combining of resources, higher order cognitive skills, and an opportunity for self-discovery and growth [Luczyn, 1999]. Towns *et al.* [2000] argue that the relationships students form in groups are of great value to the learning process, especially when students share the same

commitment level and common goals. Singhanayok *et al.* [1998] further state that group work allows for students to take control of the decision-making process, which improves the learning experience, because students put more effort into the whole process. Students involved in group work use their meta-cognitive skills more often and have more positive attitudes than students working individually. The result of this is that students taking part in group work activities learn on a higher level because of the required thought patterns being activated [Singhanayok *et al*., 1998].

According to Houdsworth *et al*. [2000], facilitators have to deal with many problems related to students involved in group work. Firstly, 'social loafing' is when a group member doesn't put in the same amount of effort into the work as the other members, or when students who perform poorly are identified [Smith, 2004]. This causes the members who do put effort into the work, to become angry or frustrated at those guilty members. Secondly, 'free-riding' is when a low-ability group member leaves the work for the other members to complete it, believing that his/her efforts won't help the group's progress. Behaviours caused by these actions are students trying to eliminate the 'sucker effect', in which a member who puts in a lot of effort realises step by step that the other members are taking him/her for a 'free ride', and then reduces his/her effort to not_being taken advantage of [Houdsworth *et al*., 2000].

## V. CASE STUDY AND FINDINGS

### RESEARCH STRATEGY AND THE SUBJECTS OF THE DATA

Semi-structured interviews were conducted with permanent lecturers at the Department of Informatics at the University of Pretoria, and lecturers from Australia and Canada. Questionnaires were distributed among second year Informatics students enrolled in a systems analysis year-course; which is also the main course of those students studying B.Com Informatics. These students were involved in weekly two-hour tutorial sessions where they worked together on assignments. The tutorials were supplementary to the lectures.

## AMOUNT OF DATA SUBJECTS ACCESSED

Four permanent lecturers were interviewed at the Department of Informatics at the University of Pretoria, three lecturers from Curtin University of Technology in Australia (including the Head of a School and an associate professor), and one associate professor from the University of Lethbridge in Canada. 116 second year students completed the group work questionnaire.

## FINDINGS

Findings derived from the interviews and questionnaires were both expected and unexpected. The lecturers interviewed in South Africa will be referred to as Lecturer 1, 2, 3, and 4; and the lecturers from Australia and Canada will be referred to as Lecturer A, B, C, and D.

The lecturers were asked the following question: Is group work a valuable teaching strategy for Informatics students? All eight lecturers answered “yes” to this question.

*Lecturer 1* provides an interesting example by stating that if you have a systems architecture lecture, the theory can become so boring that you have to make use of case studies to enable group participation. The lecturer also implies that it is better for students doing practical Informatics subjects, to work together in groups to be able to understand the work better. *Lecturer 2* says that it is important for entering the workforce one day and that Informatics is all about management. Group work learns students group dynamics and give them the necessary skills for practice one day.

*Lecturer 3* makes a good point by stating that group work is valuable because systems cannot be developed individually. *Lecturer 4* supportively states that an Informatics professional never works alone as there are analysts, designers, programmers, a project manager, etc. Thus, students need to be able to successfully work in groups and learn communication and listening skills from an early stage, as most of them will be involved in project work.

*Lecturer B* states that group work is valuable “as it teaches them a skill they will need once they work”. *Lecturer C* argues that group work can be valuable “if it is carefully supervised and monitored. It needs to be carefully structured

and managed which can take more work for the academic staff than individual assignments. It can also be very difficult to monitor individual progress within a topic if it is all group assignments." *Lecturer D* states the following about whether group work is valuable: "Absolutely – IS students will be required to work in teams once they enter the workforce". It can thus be said that group work does indeed add value to Informatics students' studies.

**What learning styles are evident in systems analysis?**

According to the literature, lectures are not very useful for convergers and accommodators, because of a low concentration span and a preference for active experimentation.

Students were asked if they are aware of their preferred learning style, and if they answered yes, they were asked to choose their preferred learning style.

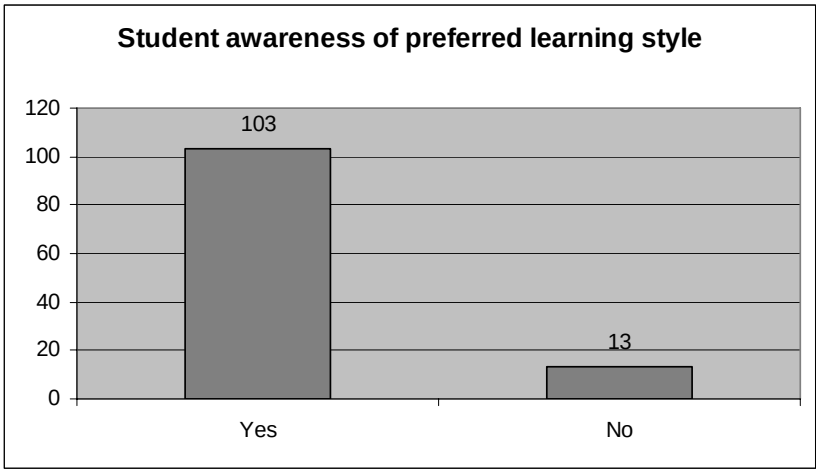


Figure 2. Student awareness of preferred learning style

As can be derived from Figure 2, it became apparent that 89% of students are aware of their preferred learning style. This indication supports the question to discover which learning styles are evident in systems analysis compared to what the literature posed.

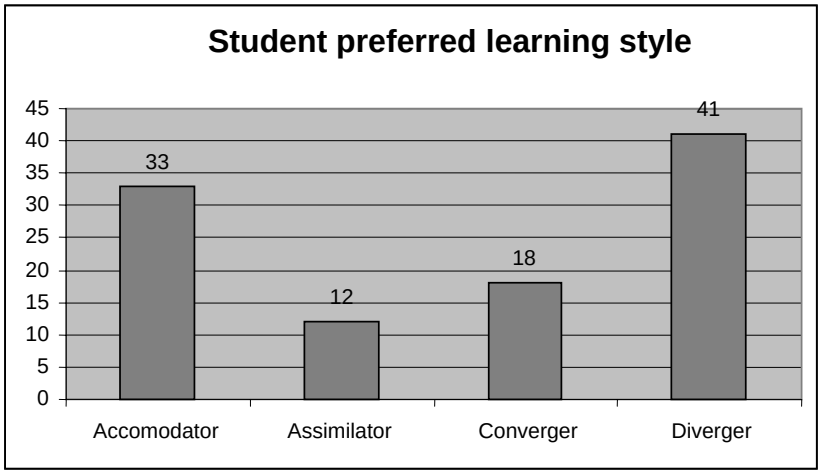


Figure 3. Student preferred learning style

As can be seen from Figure 3, most students classify themselves as divergers, then accommodators, then convergers and least as assimilators.

- 35% of students classify themselves as divergers – reflective observers with concrete experience.
- 28% of students classify themselves as accommodators – active experimenters with concrete experience.
- 16% of students classify themselves as convergers – active experimenters with abstract conceptualisation.
- 10% of students classify themselves as assimilators – reflective observers with abstract conceptualisation.

This result is interesting as the divergers and accommodators fall under the 'feel and do' and 'feel and watch' quadrants of Kolb's model – under 'concrete experience' – and not under the 'think and do' and 'think and watch' quadrants. It can be said that most Informatics students are aware of their feelings when involved in group work, but may be unsure of which learning style is truly associated to them. This may be an indication of insufficient knowledge of group work and the thought patterns required to make group work a successful activity to enhance the learning experience, but from the researcher's perspective, it is important that a group consists out of members who adopt different learning styles, just as working in a diverse group improves the overall performance of the group.

**How should facilitators use group work?**

The method used by facilitators for evaluating group performance has a huge impact on the perceptions of students and the success of group work. The lecturers were asked which method of evaluation they use most often to evaluate group work assignments.

*Lecturers 1, 2, 3, and 4* state that they frequently use lecturer-evaluation; the reason being limited time available to do any other form of evaluation. Thus the time constraint has a huge impact on their choice. *Lecturer 1* mentions that peer evaluation can be chaotic and a big job, because afterwards the lecturer often has to evaluate the work again, and this takes up a lot of time. The lecturer implies that "peer evaluation is a good idea, but not practically executable". *Lecturer 2* states that it will be best to discuss the outcome with each group after evaluation, but there is a lack of an important resource – time. *Lecturer 4* says that it would be ideal to carry out both lecturer- and peer evaluation. The lecturer also feels that it is easier to conduct peer evaluation with postgraduate students, because they really say what they think and they don't mind to give critique. Peer evaluation is not the most viable option for undergraduate students.

*Lecturer A* states: "I usually assess the results overall, then vary the result individually (up or down) based on the contribution by each student determined in two ways:
1) by looking at the extent and quality of the portions of the group work submitted that was done by each student (determined by having students put names against each section of a large assignment in the assignment's table of contents)
2) as evaluated by a peer evaluation."
*Lecturer B* makes use of lecturer-evaluation most often, by stating: "I mark the group assignment and then give all students the same mark". *Lecturer C* implies that "there is no accurate way to be able to individually assess a student's contribution to the group". The lecturer also states: "We recently had a focus group with students who were clear they preferred a single mark for

the group as a whole." This contradicts the literature in some way, as it was mentioned that interpersonal relationships and thus social interaction are negatively affected if there is one grade for each group. *Lecturer D* mentions the sufficient use of a "detailed key for each milestone requirement plus peer evaluation at the end of the semester".

**Do facilitators take different learning styles into consideration?**

The lecturers were asked whether they take different learning styles into consideration when conducting group work. All eight respondents state that they do not take different learning styles into consideration. *Lecturer 2* mentions that if aware of it, it would probably be taken into consideration. This may be due to a lack of training and experience in conducting group work. It may also be because there are too many students to manage and too little time, or it can be linked to the method of group composition chosen by facilitators which is easiest and fastest to carry out, namely "Student's choice", causing the right mix of learning styles to be ignored or eliminated.

**Do facilitators feel that they are adequately trained to manage group work situations? If not, have they conducted research on how to do group work?**

The lecturers were asked the above question. *Lecturers 1, 2 and 3* haven't received group work training. *Lecturer 1* states that extensive research was done on group work in Information systems and that it helped to know what is expected from the facilitator and how to conduct group work. *Lecturer 2* states that research has helped to see the advantages and disadvantages of group work and how to work with groups and group dynamics. It also became clear that it is difficult to manage and manipulate group work dynamics and structure. *Lecturer 3* states that current research involves the topic of group work and it helps in learning about successful and unsuccessful groups and the factors influencing it. *Lecturer 4* has received training, but mentions that the question still remains: "When was group work actually a success?" The lecturer says that the students do in fact learn, but what should have been achieved to know that it was a success? The lecturer provides and example:

"For one student 50% is good, and for another 80% is good". Thus it is difficult to determine at what level of facilitation the lecturer is successful.

*Lecturer A* states the following: "I have studied (read about and taken classes including content about) group behaviour and techniques for making groups work better. I have taught students who do group work how to overcome various group difficulties by using various techniques." The lecturer further makes a valuable statement: "To some extent, one could say that one is never successful in implementing group work as some problems always exist and, especially with young irresponsible students, some disasters almost always occur." *Lecturer B* mentions that only limited training has taken place, and that research was conducted on effective group work. *Lecturer C* has received some training and states: "I have been researching computer-supported group work for 12 years. I believe I have a very strong understanding of how groups work. This is not necessarily the same thing as training to do group work with students but much of the knowledge can be applied." *Lecturer D* hasn't received training and hasn't conducted research involving group work.

*Lecturer C* mentions the following about training and group work assignments as an additional note in the interview: "In my experience, most academic staff at my institution has a very superficial understanding of group work, student group dynamics and the problems encountered by student groups. Our recent focus group showed how out of touch staff was on this issue. I think most IS academics do not fully understand the issues involved. Superficially, it looks like a good idea but when you start asking the students and reflecting on what they are saying it can become apparent that it is fraught with problems. And I am referring mainly to the use of group assignments."

It appears that facilitators are not properly trained to manage group work situations successfully. There is definitely a need for training. This supports the literature where it is stated that facilitators are not adequately trained in the area of group work. Most lecturers state that they have done research on group work, but have had no training. Although they state that their research

has helped them in understanding group work as a teaching strategy, it is critical to be involved in physical training workshops or courses to gain group work experience.

**What do facilitators see as advantages and disadvantages of group work?**

The lecturers were asked what they perceive as the main advantages and disadvantages of group work as a teaching strategy.

*Advantages*

*Lecturer 1* states that the student-centred approach is very useful, because students learn from each other and develop good communication skills. They also learn more, trigger participation in group work activities, and get to work in a diverse environment. *Lecturer 2* says that team building is very useful and it is good for students to see a problem from different perspectives – not just from the facilitator's perspective. *Lecturer 3* mentions that students are able to achieve more in 'less' time. This can be due to more than one individual providing valuable input. The reason the lecturer mentions 'less' time, is because the time is not necessarily less – although it can be – but more effort goes into the assignment. The lecturer further says that students develop more self-confidence and dynamic skills associated to group work, as well as conflict management skills which will equip them for the workforce one day. *Lecturer 4* states that it is less work to be marked and thus less labour-intensive.

*Lecturer A* emphasises the following advantages of group work, by stating that group work:

- "gets the students to communicate to each other about and discuss what they are learning and they also learn more/better."
- "teaches them and gives them practice about how to work in groups – a key IS and business skill".
- "enables them to do a larger piece of work – more realistic to real life."
- "enables them to write a higher quality piece of work – experience doing higher quality work and raise their standards.

- "Fewer items to assess/mark", as mentioned by *Lecturer 4*.

In support of the statements made by *Lecturers 4 and A, Lecturer B* states that group work "reduces the marking load lecturers by a factor of 4 or 5" and it "helps students understand how to work together as this is important in their working life." *Lecturer C*'s view is quite different from the other lecturers. The lecturer states that "group work in class is quite useful. But with group work assignments, I don't think there is much advantage to the students. Perhaps they can work on something bigger than they can undertake for themselves. There might be some cross-learning but students report this is rare." *Lecturer D* experiences the following advantages from group work: "It satisfies one of my course objectives and learning outcomes (developing interpersonal skills such as team building) plus group work simulates IS work environment."

*Disadvantages*

*Lecturer 1* states that students can disappear in group work when it is not well planned and they will even learn less than traditional teaching. Thus, facilitators need the right techniques. *Lecturer 2* says that the evaluation and teaching methods don't equate with each other. This can cause students to be unsatisfied with the results. *Lecturer 3* states that time management and availability for group work activities is another problem, as well as conflict between members which can cause a break-up, which leads to disadvantages to students. *Lecturer 4* argues that personalities that dominate the group are the cause of others not getting a chance to give input. It is also difficult to prevent task splitting, as students sometimes don't have enough time to get together and work as a whole.

A well-known disadvantage as pointed out by *Lecturers 1, 2, 3, 4, A, and C*, is the problem of 'free-riding', where other group members don't contribute and gain from other students' efforts. *Lecturer 4* provides a good solution to this problem by mentioning the use of the JIGSAW method, which is very effective, especially to ensure that everyone contributes and thus causing less 'free-riding'. The method works as follows (as described using an example): There are 12 students in a class which will be divided into 3 groups of 4 students each. Each student is assigned a letter of the alphabet – using X, Y

and Z – and all the X's, Y's and Z's come together to each discuss 1 of the 3 questions from a case study. After these discussions, all students per group are assigned a number from 1-4, and then all the 1's, 2's, 3's, and 4's come together – to form 4 groups of 3 students each – to discuss the case study as a whole, with each student forced to contribute as he/she is the only one who was involved with the discussion of a specific question.

*Lecturer A* states the following: "Sometimes they divide the work up to work individually without ever coming together to communicate about their learning or to integrate their work properly, resulting in poorer writing and gaps in their individual learning and without getting the synergies of the first point above." This supports *Lecturer 4*'s statement made above. *Lecturer A* further argues: "Sometimes the group falls apart and it all just doesn't work – personal conflicts, loafing, and time scheduling difficulties – lots of reasons – with poor result in learning about group work." In support of the problem of 'free-riding', the lecturer says: "Sometimes/often there is a loafer who is carried by the group and who doesn't learn anything and reduces others' learning while increasing their workload." This lecturer's solution to the problem entails the following: "Sometimes the loafer is kicked out of the group and presents a problem to the instructor; I usually make them do the whole project by themselves (no reduction in scope or other reward for loafing and being caught at it)". *Lecturer B* points out that "some good students can be effectively penalised by not being able to get a good group mark similar to what they would have been able to get if they did individual assignment". *Lecturer C* highlights a disadvantage related to group work at University compared to group work in practice, by stating that "the idea that it (group work) prepares students to work in groups in the work force is a myth. I have identified 10-12 differences between working as student groups and the work place which show it is a not a useful preparation." The lecturer further implies that "any advantage is far outweighed by the disadvantages – which detract from their actual learning. These include:

- co-ordination overhead of organising meetings and working with others detracting from their actual learning the material;

- problematic group members who require additional instruction from group members or who 'free-ride';
- dealing with group members in an environment of uncertainty because they are usually doing something for the first time."

Lastly, *Lecturer D* implies that "team members are not responsible and shirk (avoid) assigned tasks/activities".

**Do students feel that provision is made for their individual learning styles?**

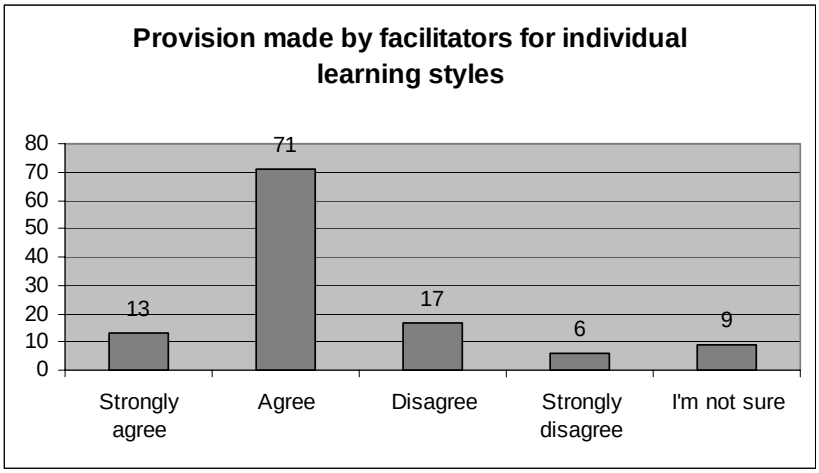


Figure 4. Provision made by facilitators for individual learning styles

As can be derived from Figure 4, 72% of students strongly agree and agree that facilitators make provision for individual learning styles when conducting group work, but out of those students who strongly agree and agree, it is noted that only 15% of them strongly agree with this statement. It is also noticed that most students who are unaware of their learning style preference, disagree with this statement, because of being unaware of what the meaning of 'learning style' actually is. This correlates with the 89% of students being aware of their preferred learning style. Most of those students who are aware of their preferred learning style, agree with this statement.

Students were asked whether the facilitator plans and manages the group work activities successfully.

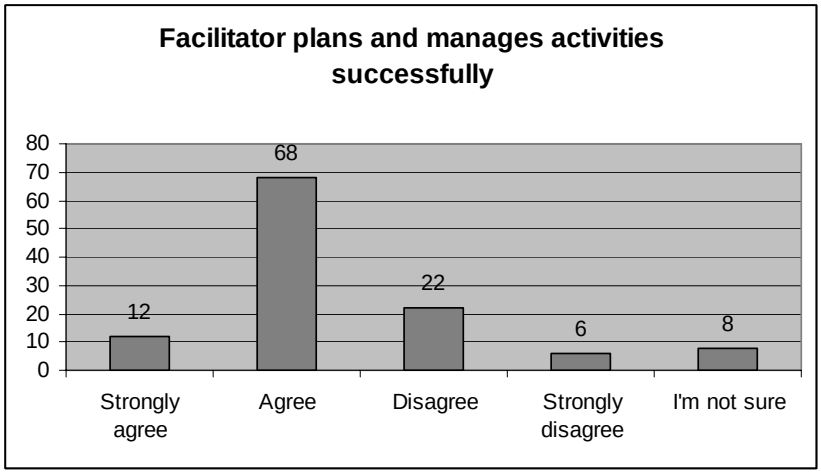


Figure 5. Facilitator plans and manages activities successfully

In Figure 5, it is clear that 69% of students strongly agree and agree with this statement, although out of those students who strongly agree and agree, only 15% of them strongly agree with this statement. This is also an indication of a need to improve the facilitator's skills related to group work, because students form attitudes towards the course by studying the actions of the lecturer/facilitator.

Students were asked whether the facilitator intervenes when necessary during a group work activity.

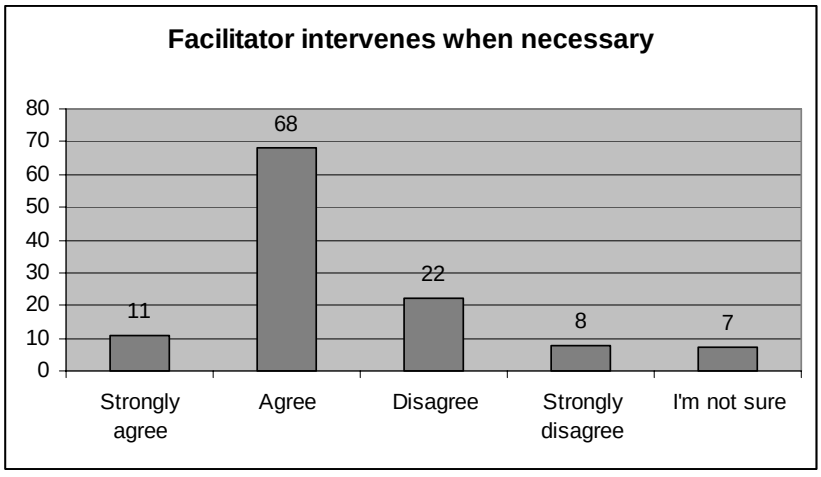


Figure 6. Facilitator intervenes when necessary

As derived from Figure 6, it can be seen that 68% of students strongly agree and agree with this statement, although out of those students who strongly agree and agree, only 14% of them strongly agree. This is also a

demonstration of the need to improve the facilitator's skills and knowledge related to group work.

Students were asked whether the group work activity is clearly explained by the facilitator.

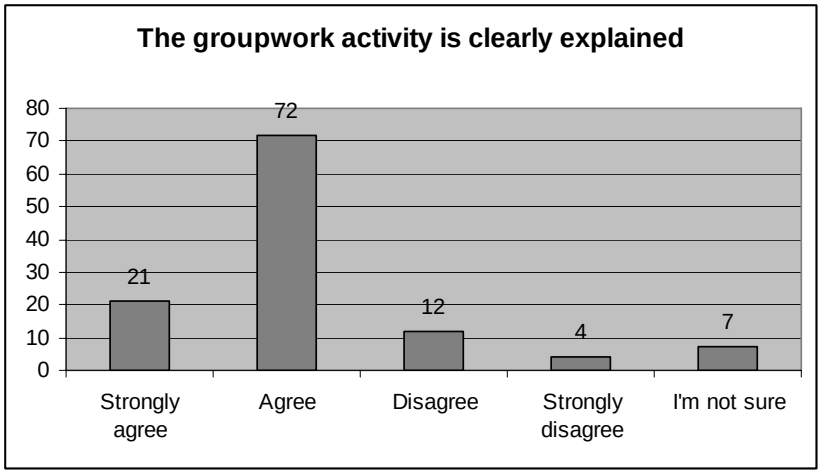


Figure 7.The group work activity is clearly explained

In Figure 7, it can be seen that 80% of students agree and strongly agree that the activity is clearly explained by the facilitator. Out of those students who strongly agree and agree, only 23% students strongly agree. As this indicates a positive attitude towards the facilitator, there is still room for improvement to gain a more positive response than the one attained to this statement.

### SOUTH AFRICA VS. AUSTRALIA AND CANADA

From the above discussions there seems to be no noticeable difference between the lecturers' perspectives about group work from the different countries, except that the abroad facilitators have received more training than those in South Africa. This can assist in identifying training needs for facilitators in order to improve group work as a useful teaching strategy.

## VI. CONCLUSION

Group work should definitely be considered in systems analysis courses because of the value it adds to the students' learning process and development. The literature highlights the value of group work in terms of teaching students the necessary skills for the workforce, as they will be

involved in group work. The findings also support this as group work teaches students communication skills and the necessary knowledge of how they should participate in group work activities to make it a success. Due to the nature of a systems analysis course and complex content, group work is a necessity for students to fully comprehend to the course material.

The facilitator plays an important role in managing the group work activity, in terms of group composition, interference to assist, and group evaluation. The literature mentions the importance of facilitators managing different learning styles and disadvantages related to composition and evaluation. The findings show that facilitators do not take learning styles into consideration and use the easiest ways of composition and evaluation due to a time constraint. The literature also highlights the importance of facilitator training to develop competent facilitators, and the findings truly support this by identifying a great need for group work training for systems analysis lecturers conducting group work, as most of the lecturers have only conducted research on the topic, which is not sufficient enough. The literature repeatedly refers to ‘free-riding’ as a well-known disadvantage of group work. All lecturers mention this disadvantage, but surprisingly, fewer students are impacted by this problem. Facilitators are aware of the advantages of group work and feel that it is an absolute necessity for systems analysis courses to include group work activities – whether in the form of tutorials or other group structures. There is also a need for adequate group work training for facilitators.

An avenue worthy of exploration is facilitator training in group work – especially in the field of Information systems. It will assist in identifying deficiencies, critical success factors and possible guidelines to constitute competent facilitators, who will then be able to experience improved results from implementing group work.

Group work is thus a valuable teaching strategy and will always be an integral component of systems analysis courses.

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