

Handling Diversity in Group Work in the Information Systems Class

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Abstract

Tertiary institutions in South Africa are faced with dealing with diversity in all its forms in our classrooms. Information Systems, Information Technology and Computer Science students need to learn to work with people who are different from themselves in order to learn to work effectively in the work environment to which they will go. Teaching students in a multicultural classroom to be able to practise their profession in multicultural settings is crucial. This paper looks at the problems that occur if we ignore diversity, some techniques for dealing with diversity, especially when using group work and then presents results of a series of four case studies where some of these techniques were applied.

Keywords: Information Systems Education, JAD, Co-operative learning, diversity

Computing Review Categories: K.3.2

Language, culture, gender, age, physical abilities or learning styles are all sources of diversity. Tertiary institutions in South Africa are faced with dealing with diversity in all its forms in our classrooms. Information Systems, Information Technology and Computer Science students need to learn to work with people who are from different backgrounds. Teaching students in a multicultural classroom to be able to practise their profession in multicultural settings is crucial [11].

1 Information Systems Students and Diversity

The IS'97 curriculum recognises this need. They list interpersonal and communication skills as two of the main characteristics of an IS graduate. They then expand this to include graduates having the ability to effectively work with people of diverse backgrounds [4].

Students come to tertiary institutions with a wide range of experiences and backgrounds. Each learner has unique gifts and unique needs that should be taken into consideration when developing learning environments, curriculum material and instructional strategies [7].

2 Problems Associated with Diversity

Ignoring the diversity in our classrooms can make students feel marginalised and can increase the domination process within tertiary institutions [12].

People see themselves as part of a group. Social iden-

tity is part of how people identify themselves. Being part of a group leads to dividing the world into in-groups and out-groups where other people are perceived as either being from one's own group or belonging to the other group. [1] Aspects that are used to determine groups include race, age, sex and culture. Members of the out-group are seen as homogeneous and not as individuals. This leads to stereotyping and prejudice [1]. As people from different cultures communicate, they bring with them their cultural knowledge and background. This causes them to speak from their cultural perspective and interpret the communication of others from this perspective [9]. Some cultures do not encourage children to ask questions or participate in conversations with adults or teachers. This can cause students to feel very apprehensive about participating in class or group discussions [14].

Gender is another source of diversity that brings problems to the classroom. Groupwork is seen as a positive learning method for women more than for men [10]. Gender can be an issue in preference for roles within a group, however. Females often have the social skills necessary for managing the group, while the males may have better technical skills [10]. In some cultures, females have a difficult time asserting themselves when there are males in the group and some males have difficulty in working with female leaders. Men might also see women as being good secretaries, for example, and put them into this role. This can lead to conflict.

3 Methods of Dealing with Diversity

Diversity can be an enhancement to learning rather than a hindrance if it is integrated into the classroom process in an

effective way. Students need to learn to work in a multicultural workforce and their classroom experiences can help them to develop the social, cognitive and communication skills necessary to do this.

Lecturers should try to use examples, analogies and materials from diverse students experiences in order to help them to connect with their prior understandings. Moahloli and Phooko [9] suggest that this implies that lecturers should try to contextualise new information in terms of the different students' real-life experiences.

A problem that lecturers often have in the multi-language classroom, is that they do not learn the names of the students or that they cannot pronounce those names. Lecturers should make a concerted effort to learn and pronounce the names of all the students in the class as this will enable them to call on all the students in the class to participate, rather than leaving some out whose names cannot be pronounced.

Frederick [5] suggests that the lecturer should encourage students to be respectful of one another. The challenge lies in encouraging the students and lecturers to see one another as individuals while still recognising that these individuals belong to a culture with specific norms, values and beliefs that may be different to one's own.

There are various theories from psychology that help people to recognise that they are prejudiced or using stereotypes and cause them to change. Two of these will be described briefly below [1]:

Contact theory maintains that contact between different groups can decrease prejudice as the different groups get to know one another. As people realise their similarities with others and discover their misconceptions caused by stereotyping, they will decrease their idea that the "out-group" are homogeneous. There is a problem, however, as it has been shown that contact must take place between people of similar social and economic status in order for change to occur [12].

Social identity theory maintains that a person will strive to establish and maintain a positive self identity and that this identity will have both a social and a personal component [8]. This means that people go through a categorization process in determining the groups that they belong to. This then leads to an "us" and "them" recognition.

Some authors suggest that it is useful to have special classes for students to learn about each others cultures [3]. One must be careful that this does not turn into a "tourist" view of the culture where stereotypes and generalisations about the culture are made worse rather than better. Goduka [6] suggests that one needs to have activities that foster critical thinking about prejudice, racism and try to affirm unity and diversity in the curriculum rather than just "visiting" other cultures. This needs to be an ongoing process. Miller and Harrington [8] argue against having students having discussions about their similarities and differences. They say that any group labelling will create boundaries and that building bridges between groups does not occur by making groups aware of in- and out-groups.

4 Diversity in Groups in the Classroom

Some proponents of group work see it as a means of assimilating the minority group into the more dominant group. One of the aims of the group work, according to assimilationists is to foster ethnic integration. Another view of group work is that it should be used to advocate intercultural cooperation by cultivating equal coexistence and mutual respect for students from different cultural groups. This is termed pluralism [13].

4.1 Dividing the students into groups

Rosser [10] warns against allowing students to form their own groups or using the counting method to divide students into groups. She says that these methods may be suitable for students who are mature and have high self esteem, but they fail to enhance learning for the more vulnerable student. Having the lecturer choose the groups allows the lecturer to take gender, race, abilities and experience into account. Mixed ability groups help to ensure that each group progresses successfully [10].

Miller and Harrington [8] argue against having students placed into groups according to the ratios that reflect the composition of the class because that can make the in- and out-groups salient. They suggest that assignment based on a student's abilities or skills or random assignment is preferable.

Research has shown that it can be harmful to minority students to be placed on their own in a group [10]. One minority student in a group can lead to that student feeling left out and dropping out of the course or group. The groups should thus be made so that each group has at least more than one person from the minority, whether it be racial or gender minority.

In groups where roles are assigned, one must be careful not to assign roles along stereotypical lines, for example, by assigning a female to be the secretary every time. These roles should be rotated or should be assigned randomly [8].

4.2 Dealing with cultural differences in groups

There can be problems in trying to introduce group work and co-operative learning into a classroom if the students come from a background or culture where they are not expected to ask questions and participate in class [14]. Students are often apprehensive about working in teams, giving presentations and other learning methods where they are required to work with other class members. We need to explain to students the rationale for each activity and describe what the learning objectives are in order to reduce that apprehension [14].

5 Research into Group Work in the IS Classroom

During 1998, a research project was started at the Port Elizabeth Technikon to determine how one could effectively use Joint Application Development (JAD) techniques in the classroom. A series of case studies have been carried out since 1998. The first and second case study were described in more detail in Thomas (1999). An overview of the four case studies will be described first, followed by a description of how some of the preceding suggestions were incorporated into the JAD classes. During the course of these case studies, the issue of diversity was investigated and the students' enjoyment, feelings of acceptance, feelings about having their say and their ability to contribute were measured both quantitatively and qualitatively. There number of students who answered the questionnaires was 75 in the first case study, 87 in the second, 68 in the third and 117 in the fourth.

5.1 An overview of the case studies

The first two case studies and the fourth case study were done with the second year Information Technology students at the Port Elizabeth Technikon. The third case study was done at the Border Technikon. During the first case study, the techniques of JAD were taken and used, almost with no change, in the classroom. The aim of the JAD session was for the group to model a system from a scenario given to them by the lecturer. All the students were given the same material. The students played the roles of facilitator, scribe, users and IT personnel. In the first Case Study, the students formed themselves into groups and as any latecomers came, the lecturer would place them into the group with the least number of people.

While the method was fairly successful, problems experienced during the first case study included people not participating, the formation of cliques, people feeling left out and domination by some.

During the second case study, the techniques of co-operative learning were combined with the techniques of JAD to make it more effective for use in the classroom. Students were given training in communication and working in groups before the sessions, the students were given different materials to promote positive interdependence, the students set up their own group norms and they evaluated themselves after the sessions. These techniques proved to be fairly successful but there were still problems with the minorities within the class being dominated and not participating. The Xhosa-speaking students in the class seemed to be shy and did not take part as one would have hoped.

It was decided to do the third case study at the Border Technikon where the students are almost exclusively Xhosa speaking (92%). The students at Border Technikon had no problems. They participated well, enjoyed it and felt that they had learnt a lot. This seemed to indicate that the problems the Xhosa speakers were experiencing were

not due to their cultural upbringing, but were rather due to the diversity of the groups at Port Elizabeth Technikon and their feeling shy in the multi-cultural environment.

The diversity issue was then investigated and changes made to help deal with diversity. This was tested in a fourth case study at the Port Elizabeth Technikon.

5.2 Incorporating techniques for handling diversity into the sessionsx

Many of the techniques for handling diversity mentioned previously were already in the JAD sessions while others needed to be added. Some were included from Case Study 2 and others only in Case Study 4.

5.2.1 Techniques for handling diversity added during Case Study 2

The JAD and co-operative learning environment offers an opportunity for students of different cultures, classes, ethnic groups, ages, sex and learning styles to interact with one another. The students are given an indication of how they would need to practise their profession in a multicultural setting.

Contact theory supports the idea of working in small groups that are structured to promote contact. This was done by combining the techniques of JAD with the co-operative learning. During the second and third case studies, the lecturer had chosen the groups to be of mixed ability, gender, race and experience.

From the second case study onwards, the material for the case studies had been chosen to be appropriate to the diverse student body by using such diverse examples as a health club and a free clinic. The material was given to the different students so that they were forced to co-operate with one another in order to get the end result.

Group skills and group function skills were also taught to the students during Case Studies 2 and 3. This included discussions and exercises on communication, decision making and conflict handling within groups. Each group set up their own norms for group functioning although the lecturer did monitor the group.

5.2.2 Modifications to the learning environment for catering for diversity in Case Study 4

One of the problems found was that some students tend to be passive and did not participate, whilst others are aggressive and try to dominate the session. It was decided to give the students some insight into what it means to be assertive and techniques that they can use to improve their assertiveness. An assertive person was defined as having respect for themselves as well as for others. The assertiveness training was done first.

There is some debate in the literature as to whether students should be given explicit instruction about one another's culture or not, as previously discussed. A middle road was chosen for this study. No specific instruction on

different cultures was given, but while the students were doing their workshops on communications and group processing, special problems caused by diversity were highlighted. Problems that the lecturer, herself, had experienced when trying to converse in a second language were described, for example. Differences in the way that the Xhosa- and English-speaking students use body language was an example of communication that was discussed. The idea of respecting one another's viewpoint and listening with empathy to a speaker was emphasized.

The lecturer also made sure that examples and case studies used with the students in the entire course were more suited to the diverse student body. She found, for example, that most of her notes and examples used English, male names and some of these were modified to reflect Xhosa and Afrikaans names as well as names of females.

The students were once again put into heterogeneous groups by the lecturer. It was decided to take the advice of Rosser [10] who suggests that minority students should not be placed on their own in a group. She suggests making sure that there are at least two people of each minority in a group even if some groups then have no minority students.

Both the students and the lecturer often had problems learning the students names. The students were given name tags to wear in the initial sessions and were asked to make sure that they all learnt one another's names including the pronunciation. As name tags are quite common in JAD sessions, it was put to the students as a method that might be used in industry.

5.3 Results from the case studies

The case studies were used to study many aspects of group work. Only answers to questions that give an indication of the students' feelings of acceptance in the groups, their participation in the groups and enjoyment of group work will be described as these are relevant to this point. Some of the comments made in the open-ended questions will also be described.

As can be seen from the graph in Figure 1, the students experience of the group work was relatively constant through the three case studies done at Port Elizabeth Technikon, namely CS1, CS2 and CS4. Only the students at Border Technikon experienced it more positively.

The students were asked to comment on what they enjoyed or did not enjoy about working in the JAD groups. From the first case study students commented that they enjoyed hearing other people's ideas, interacting with other people, working as a team, arguing, debating and reasoning with one another and working with people they did not normally work with. The biggest problems from the first case study were people who did not participate and the problems experienced by the different language groups.

During the second case study, heterogeneous groups were formed by the lecturer. This seemed to solve the problem of the language difficulties. On the negative side during the second case study ten students mentioned that they disliked not having their ideas taken into considera-

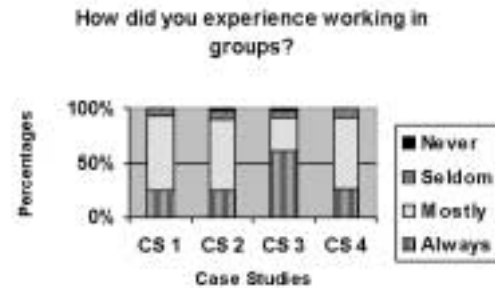


Figure 1: Students' experiences of group work

tion. On further analysis, it was found that two of these students were English and the other eight were Xhosa-speaking. As only thirteen Xhosa-speaking students had filled in the questionnaire, this was a large percentage of these students. One of the students in this case study commented: "I think that JAD is a brilliant method of educating, If the members participated it would be beneficial. South Africa still has serious racial problems and language barriers. It is sad that students cant even do mock JAD without racial conflict."

The students in the third case study at Border technikon were overwhelming positive about their experiences in the group. The homogeneous groups seemed to work well together.

Many of the comments of the fourth case study were similar to previous years but there were many more positive comments and less negative ones than had been expressed in the previous years. It was interesting to note that the number of students who mentioned that others did not take their ideas into consideration went down from ten in Case Study 2 to four in this case study. Of those four, one was English, one Afrikaans and two Xhosa-speaking.

There was a definite improvement over the three case studies at the Port Elizabeth Technikon with respect to the students feelings of acceptance as can be seen in Figure 2. The feelings of acceptance in the diverse class at Port Elizabeth Technikon was almost as good as that in the more homogeneous class at Border Technikon during the last case study. There was an improvement when the co-operative learning techniques were introduced (from 54.7% to 71%) and another improvement when the techniques for dealing with diversity were added (from 71% to 83.5%).

During the first case study some of the students commented on the problem of "cliques" being formed in the groups which made them feel left out. This could also be as a result of the way in which the groups were formed. During the second case study, when the co-operative learning techniques were added, the students feelings of acceptance improved. The teaching of the group skills before the time was also effective in helping to improve group cohesion and group decision making, which in turn helped the

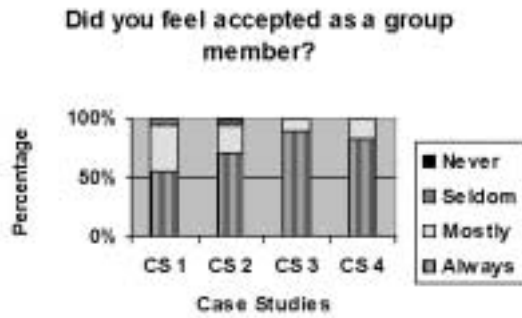


Figure 2: Students' feeling of acceptance as group members

students to feel more accepted within their groups. There were still some students during Case Study 2 who complained of feeling left out or that their ideas were ignored, however. It was not only the Xhosa-speaking students who had a problem, one of the female students wrote: "Being blonde and female, I was treated as a secretary by our 'superior' male members".

The students from Border Technikon, during the third case study felt that they were either always accepted in their groups (88,3%) or mostly accepted (11,7%). One student commented: "I felt shy initially but ultimately I felt free."

The figures for the fourth case study with respect to students' feeling of being accepted were excellent. Students mentioned that the atmosphere was friendly and that people listened to them and treated them with respect. One student commented: "They accepted me just as I am, did not look for faults or anything." There were hardly any negative comments and everyone felt that they were always or mostly accepted in their groups.

Other factors that may be influenced by students' diversity is if the students felt that they were able to have their say in the group and if they felt that they themselves contributed. The results of these questions can be found in Figure 3 and Figure 4.

One can see a definite improvement of the results of the students perceptions of being able to have their say, over the case studies that took place at Port Elizabeth. Once again, the Border Technikon students felt the most positive about this. Those who felt that they were always able to have their say went up from 28.4% in the first case study to 40.7% in the second and 52.1% in the last. The techniques used did seem to improve the students perceptions of this.

Through all the case studies many students commented that everyone was able to have their opinions taken into consideration and that the facilitators tried to accommodate everyone. The students did say that some of the facilitators had problems, however.

There was a steady increase in the students' percep-

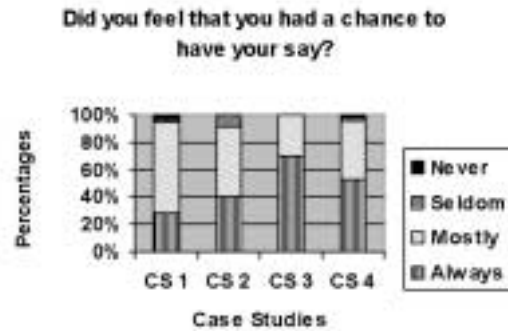


Figure 3: Students' feelings about whether they were able to have their say

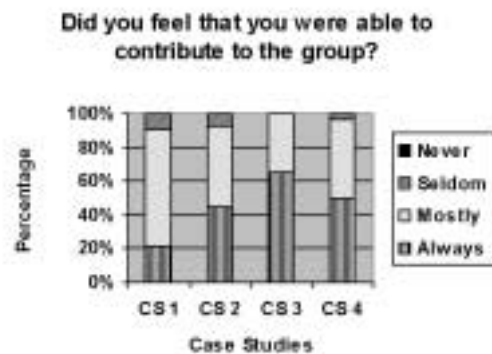


Figure 4: Students' perceptions of their contribution to the group

tions with regard to their own contributions. The biggest increase occurred with the introduction of the co-operative learning techniques with those who felt that they always contributed going from 21.6% to 44.7%. A small increase of 4.5% occurred between Case Studies 2 and 4. Once again the students from the homogeneous group had the highest percentage of students who felt that they always contributed.

Students from Border Technikon made some interesting comments in the answers to the open-ended part of this question. One said: "Everytime that comes discussions, I participate very much so that I can know my own mistakes and give my views to the group." Another commented "I actually felt good about myself because it is something that I am not used to."

Many students during Case Study 4 commented that other people listened to their ideas and that these ideas were used by their group.

6 Conclusion

This paper gave an indication of some of the problems that can be experienced if we ignore the issue of diversity in our classrooms. A background from the literature was then used to give some guidelines that can be followed to improve our handling of the diversity issue in the classroom and particular when doing group work. The results of the four case studies were used to show how the students' perceptions and attitudes with respect to their own group work were influenced by the changes made during each of the case studies.

Dealing with diversity is a complex issue and it would be impossible to try to solve all the problems in one part of the curricula or in one class. The challenges and the opportunities offered by the diverse student populations need to be built into all the curricula of an institution in order to be effective. Students, staff and curricula need to be prepared for working in a diverse world.

References

- [1] Baron, R.A., Byrne, D. (1991) *Social psychology: Understanding human interaction*, Boston: Allyn and Bacon.
- [2] Bitzer, E., Venter, K. (1996) Cultural diversity on campus: A community of learners perspective, In Bitzer E.M. (Ed) *Perspectives on multiculturalism*, Bloemfontein: University of Orange Free State, pp14-24.
- [3] Bodibe, R.C. (1997) Unity within diversity: A move from rhetoric to reality, *Post Conference Proceedings of a multicultural conference*, Bloemfontein: Academic Development Bureau, University of the Free State, pp19-25.
- [4] Davis, G.B., Gorgone, J.T., Couger, J.D., Feinstein, D.L., Longenecker, H.E. (1997) *IS'97: Model curriculum and guidelines for undergraduate degree programs in Information Systems*, Association of Information Technology Professionals.
- [5] Frederick, P. (1995) Walking on eggs: Mastering the dreaded diversity discussion, *College Teaching*, 43(3), pp83-92.
- [6] Goduka, I.N. (1996) Reconstructing education to affirm unity and diversity: What will it take? In Bitzer E.M. (Ed) *Perspectives on multiculturalism*, Bloemfontein: University of Orange Free State, pp25-41.
- [7] Goduka, I.N. (1998) Linguistic and cultural diversity: implications for learning, educating and curricula transformation, *South African Journal of Higher Education*, 12(1), pp34-43.
- [8] Miller, N., Harrington, H.J. (1990), A situational identity perspective on cultural diversity and teamwork in the classroom, In Sharon, S. (ed), *Cooperative learning: Theory and Research*, New York: Praeger Publishers, pp 39-75.
- [9] Moahloli, C., Phooko, C. (1998) Management of cultural diversity at Glen Agricultural College, In Weir, J. (ed.) *Collaborative staff development for quality teaching and learning in South African further and higher education*, Links programme.
- [10] Rosser, S.V. (1998) Group work in science, engineering and mathematics: Consequences of ignoring gender and race, 46(3), pp82-88.
- [11] Sanchez, W., Fried, J. (1997) Giving voice to students' narratives: Cultural criticism and education in the helping/service professions, *College Teaching*, 45(1), pp26-31.
- [12] Sharan, S., Russell, P., Hertz-Lazarowitz, R., Bejarano, Y., Raviv, S., Sharan, Y. (1985) Cooperative learning effects on ethnic relations and achievement in Israeli Junior High School classrooms, In Slavin R., Sharan S., Kagan S., Lazarowitz R.H., Webb C. & Schmuck R. (eds) *Learning to cooperate, cooperating to learn*. New York: Plenum Press, pp313-344.
- [13] Sharan, S. (1985) Cooperative learning and the multiethnic classroom, In Slavin R., Sharan S., Kagan S., Lazarowitz R.H., Webb C. & Schmuck R. (eds) *Learning to cooperate, cooperating to learn*. New York: Plenum Press, pp255-262.
- [14] Tomi, A.D.F. (1996) Challenges and rewards in the mixed culture classroom, *College Teaching*, 44(2), pp69-73.