

# THE INFLUENCE OF DIFFERENTIATED ASSIGNMENTS (SCAFFOLDING METHODS) ON FIRST-YEAR STUDENTS-TEACHERS' ACADEMIC PROGRESS

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## Abstract

The aim of this study was to determine the influence of differentiated assignments, using scaffolding methods, on the possibility of improving first-year student teachers' academic progress in a South African university. Research participants ( $n=296$ ) were divided into two groups, Group A ( $n=136$ ) and Group B ( $n=160$ ), who were engaged in this study during the first semesters of their courses in the years: 2012 (group A) and 2013 (Group B). Only Group B was supported with differentiated assignments that included scaffolding methods. The participants of both groups completed two assignments and a test in the first semester. Results were recorded and compared to formulate findings and recommendations. The results presented in this article will assist lecturers in evaluating differentiated, scaffolding activities, that could be used to support first-year students who are encountering various learning barriers in higher education. These extra scaffolding methods showed to contribute to the academic success of first-year student teachers.

**Keywords:** *Differentiated, scaffold, barriers, language, student teachers, academic progress.*

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## 1. Introduction

Despite the inclusion of the Bill of Rights in the Constitution of the Republic of South Africa, Act 108 of 1996 (RSA, 1996), which guaranteed educational opportunities for all students with all abilities, cultures, races, languages, infectious diseases, genders and religions, this has not successfully been implemented in educational institutions. The majority of the South African first-year students enter higher education with barriers such as a lack of funds to purchase study material (causing anxiety and stress), change of living environment from a rural to an urban context, and language barriers, to mention only a few (Steyn & Kamper, 2011).

The academic language that is used in lecture halls is often students' second language. Coupled with diverse cultural backgrounds, this could negatively influence their learning approach, as students may not be able to interpret new terminology correctly (Barlow, 2002). Dale and Cuevas (1992) highlight that terminology is closely connected to content, and hence the students' levels of language proficiency can influence their academic success. The reason being that students may find it difficult to grasp the meaning of questions in summative assessment, while constructive feedback on formative assessment could be interpreted incorrectly (De Vito, 2000, p. 170).

Research by Okoro (2000) and Paul and Elder (2008, p. 34) indicate that students cannot successfully progress in tertiary institutions if they are unable to communicate effectively in English and apply critical thinking skills in learning activities. If students find it difficult to cope with English as a second language, it may cause them to eventually fall behind or drop out from university (Oluwole, 2008, p. 41).

Apart from the barriers listed above, studies by Barnes and Piland (2011, p. 4) show that factors such as poor time management skills, the fast pace of the teaching in classes, large class sizes, the large volume of content covered in every class, insufficient face-time with lecturers, family responsibilities, insufficient study skills, and a lack of self-discipline and motivation could also be considered as barriers that could influence academic success. In addition, Steyn and Kamper (2011) indicate that student equity cannot be achieved solely by the allocation of bursaries to students from diverse socioeconomic contexts, courses should also include supportive teaching methods to develop students' potential. Therefore, academic support needs to be revised and adjusted to students' needs.

Vacca (2008, p. 23) postulate that intervention strategies (scaffolding methods) to assist students can support them to achieve successful academic results in higher education. Scaffolding is an effective

strategy by which a competent person (adult or a peer) assists students to execute an assignment beyond their existing abilities (Hammond, 2002, p. 23). Assignments and course material can be designed in a manner that will enable students to solve problems, achieve the lesson goal and complete the assignment successfully with the support of the lecturer (Daniels, 2001, p. 61). Barnes and Piland (2011, p. 3) are of the opinion that a pre-orientation programme for first-year students can be helpful to teach them study and time management skills, developing supportive mentor and peer relationships, and getting acquainted with the college campus facilities.

In line with the various barriers students encounter at tertiary level, I adopted an inclusive mind- set in this study to accommodate students' learning needs. To support students in achieving academic success, I employed differentiated assignments consisting of scaffolding methods, not only to assist students with language skills but also to develop their critical thinking skills.

The findings of this article are based on the information gained through quantitative data. First-year students' test results of 2012 (no scaffolding methods were used) and 2013 (differentiated assignments were employed) were recorded and compared to determine the effectiveness of scaffolding methods in the form of, differentiated assignments on the academic progress of students.

## 2. The importance of scaffolding methods

The study was guided by the social theories of Vygotsky and Bourdieu. Vygotsky's socio-cultural theory (1978, p. 79) advocates that support (scaffolding) from an educated person to a novice is important to acquire knowledge successfully. According to this theory, meaningful concepts, cognitive growth and learning emerge from social interaction between students on an interpersonal level. This social interaction enables students to construct new knowledge from their understanding by progressing from what they already know (actual development) to new knowledge (potential development) (Vygotsky, 1978, p. 79). This is in line with Bourdieu's social capital theory that student teachers should interact with their peers in class, share ideas and discourse in order to communicate effectively in a language and acquire knowledge and skills that will support (scaffold) them to progress academically (Bourdieu & Coleman, 1991, p. 31). Studies by Wertsch (1991, p. 7) and Field (2004, p.7) show that the support of an educated person is needed to assist a novice to solve problems while, verbal communication between students is important to clarify new concepts and share ideas.

In this study, scaffolding (extra-support) can be defined as an educated person (the lecturer) that supports a developing adult (student-teacher) by creating differentiated assignments according to students' learning styles. Differentiated activities are created to address the learning needs of students by changing and modifying assignments, assessment, teaching and learning methods in the class (Tomlinson, 2003). Chapman and King (2005, p. 45) emphasise that before a lecturer can create differentiated assignments, baseline and diagnostic assessment methods should be used to determine major learning barriers in class. These assessment methods can include: portfolios, quizzes, self-reflections, class discussions and others to establish students' weaknesses and strengths (Tomlinson, 2003).

Various scaffolding methods can be combined with differentiated activities to assist second- language English students to achieve academic success. Differentiated assignments are developed to enable all students to progress academically regardless of their various learning styles and barriers. Differentiated activities can be created in the following ways: using interesting topics, modifying the curriculum, using flexible and a variety of scaffolded learners-centred teaching methods and strategies, employing differentiated assessment procedures, creating a supportive learning environment, and teaching strategies, using a variety of equipment, resources and media, and allocating extra time to complete assignments (De Jager, 2013, p. 80).

Visual scaffolding is emphasised by various research studies as an important method for assisting students to grasp new concepts. Oluwole (2008, p. 41) claims that if sufficient visual images were included in teaching and learning activities, students would become visual thinkers and retain information for a longer period. When solving a problem and thinking critically, students base their primary thoughts on visual images rather than words (Cifuentes & Hsieh, 2004, p. 109). Examples of visual scaffolding methods include: pictures, videos, 3D animation, photographs, graphical presentations, [graphs, maps, tables] and others.

The value of constructing and interpreting visual presentations in the form of drawings is underestimated in students' support. Drawings can be used as a "thinking activity" to clarify the facts and theories of objects and natural phenomena; to express one's understanding of a concept; to generate new ideas; to reflect; and to facilitate problem solving (Oluwole, 2008, p. 41).

The rationale for this study is that the findings will contribute to the field of scaffolding instruction by assisting lecturers to adopt an inclusive mind set when creating differentiated activities and modifying lecturing methods according to students' needs.

### 3. Research method and design

First-year student teachers of both academic years 2012 ( $n=136$ ) and 2013 ( $n=160$ ) of a South African University participated in this study. The research was based on quantitative data collected in the first semesters of both 2012 and 2013. The data was supported and guided by theoretical findings in the literature study to determine the effect of differentiated activities (scaffolding methods) on first-year student teachers' academic progress. In this study differentiated learning activities consisting of various scaffolding methods were employed to support students' needs.

The research methodology was based on the research aims, namely:

- to determine whether scaffolding methods used in differentiated assignments could improve students' academic progress; and
- to establish whether scaffolding methods could contribute to their ability to develop English language and critical thinking skills.

To determine whether differentiated assignments (scaffolding) could improve first-year students' academic progress, the academic results of two groups', Group A (academic year 2012) and Group B's (2013), were recorded and compared with one another.

The research was executed during the first semester of each academic year. The same two assignments, based on solutions to challenges in education, were completed by Groups A and B in the subject "General Subject Didactics". However, two differentiated assignments consisting of scaffolding methods were constructed for Group B only.

### 4. Differentiated assignments

During the first semester, the lecturer used diagnostic, formal and informal assessment techniques to identify students' major learning barriers. The main barriers diagnosed were insufficient English language skills, lack of confidence to communicate in class discussions, the inability to question unclear concepts, lack of time management and critically thinking skills. To encourage active class participation that could affect their academic progress, *three* differentiated assignments (consisting of various scaffolding methods) for each of the two assessment opportunities were designed to accommodate the different learning styles of students. Once the students' had selected an assignment consistent with their learning preference, they were grouped according to their choices and a handout consisting of the extra support (visuals, text, graphs, etc.) was provided to enable them to complete the assignment. Students could choose which differentiated assignment they wanted to complete. Differentiated assignment examples were as follows:

- Students had to reflect on visual images provided and summarise in English writing, the new concepts deriving from the images and how these concepts could be applied in real-life situations to solve problems.
- Students had to draw pictures on how they would solve a problem (if they lacked English writing skills) which was constructed from real-life examples, they had to identify key phrases and were challenged to create their own problems in a written essay on the topic.
- Graphic presentations (tables, graphs, etc.) were used to interpret new data and a short summary of observation, interpretation and problem solving followed, after which a short class activity in writing was created where they had to review and criticise a peer's work. After the completion of each assignment, all students were engaged in active, small-group class discussions explaining new concepts to one another and finally presenting their findings to the rest of the class. The two assignments and the test for the first semester of both groups were assessed, recorded and the averages compared.

### 5. Data analysis and discussion

The two assignments for both Groups A and B were constructed on the same problem solving questions and prescribed content. The first assignment results of both Groups A and B were rather disappointing; Group A averaged 48% and Group B, 52%. The possible reason for the poor results could be that students were not proficient enough in English to understand new concepts.

Other reasons might be that students were not orientated to learn in large classes (Group A=136 and Group B =160) and might have suffered from a lack of funds to purchase study material. Steyn and Kamper (2011) point out that a financial barrier can cause anxiety and stress in students and contribute to poor academic performance. In addition, the same authors mention that student equity cannot be achieved by allocating study bursaries to students from diverse socioeconomic contexts, consequently courses should include supportive teaching methods to develop students' potential. It follows that academic support needs to be revised and adjusted to students' needs. In this study, it was also found that 80% of all

participants were from rural areas and had to adjust to a new urbanised learning environment that may have contributed to the low scores in the first assignment. Although the differentiated activities did not contribute to the results the researcher had hoped for in the first assignment, there was an improvement of 4% in Group B in 2013. The improvement could be connected to the extra support (scaffolding) students received in the form of differentiated activities.

The differentiated activities, students selected were as follows: only five students chose the option to draw their findings of the stated problem, 12 selected the interpretation of graphs, and 143 chose visual images. It was significant that students who chose assignments supported with images received higher scores than those who chose the interpretation of graphs and the drawing of findings. The reason might be that students were unable to apply drawing and critical thinking skills to interpreting data, while the objectives of the assignment might not have been clear to students. With the second assignment, the average of Group A declined to 2% (46%) and Group B only increased by 3% (55%). The low scores could most probably be linked to the short academic semester and the fact that many students had not returned to campus after their practical teaching. The reason might be that many students from other provinces and from low-income families did not have sufficient funding to be transported back timeously from home to campus for the first lecture. Student absenteeism in lectures may have influenced the results. It seems that a follow up study is necessary where I use interviews to find out what exactly the barriers are that students face. It was established again in assignment two, that most of the students ( $n=142$ ) in Group B selected the differentiated assignment with visual images as a scaffold. The reason might be that students were still not confident with the learning of new terminology in a second language and were not able to apply critical thinking skills. Although students were engaged in small-group activities which enabled them to interact and explain unclear concepts in either their mother language or English to one another, students still lacked self-confidence to present their findings to the rest of the class. The reason could be connected to students' low self-esteem in expressing themselves in English as a communication medium. After completing the two assignments, students wrote a test at the end of the first semester. The assessment results of the first test increased from 48% for Group A to 54% for Group B. The low scores of Group A might be related to insufficient support during assignments. Furthermore, previous feedback on assignments which should have been constructive might have been interpreted negatively or incorrectly. Although Group B's test results, averages were 6% higher than that of Group A, students still lack sufficient language, critical thinking, study, and time management skills, despite the scaffolding methods employed. The reason for Group B's higher test results could also be linked to the possibility that students gained more confidence in the course material with the assistance of differentiated assignments (scaffolding methods) and were intrinsically motivated to progress academically.

## 6. Conclusion and recommendations

In this study, 80% of the students from diverse backgrounds struggled to adjust from a rural to an urban learning environment and to finance their studies. Although a financial barrier can cause anxiety and stress in students and contribute to poor academic performance, supporting students with study bursaries cannot guarantee students' academic success. To assist students whose learning experiences changes from a rural to an urban environment, supportive teaching programmes and methods to develop students' potential and a pre-orientation programme for first-year students could be helpful to acquaint students with available support structures, campus facilities and to develop supportive mentor and peer relationships, while teaching them study and time management skills. In addition, an introduction to the course could commence with a handout to students that consists of a glossary of academic terminology pertaining to the subject. It follows from the above that, academic support needs to be revised and an inclusive approach needs to be adopted to address students' needs in creating differentiated assignments. In such assignments, various scaffolding methods should be employed to assist students to clarify new concepts, support insufficient language skills and enable them to apply critical thinking skills in problem solving. Differentiated assignments could be created as follows: using interesting topics, modifying the curriculum, using flexible and diverse scaffolded learner-centred teaching methods and strategies, employing differentiated assessment procedures, creating a supportive learning environment and teaching strategies, using a variety of equipment, resources and media and allocating extra time to complete assignments. The design of differentiated activities can be created in a way that enables students to solve problems, achieve the lesson goal and complete the assignment successfully with the support of the lecturer. Students with language and critical thinking barriers can achieve higher scores in assignments when concepts are clarified with visual images. The value of visual presentations and interpretations is often underestimated in student support. Visual images included in teaching and learning activities can clarify difficult concepts and encourage students to become visual thinkers. By connecting new concepts

to visual images, information is retained for a longer period. Students with drawing skills can use these skills as a “thinking activity” to clarify the facts and theories of objects and natural phenomena; express their understandings of a concept; generate new ideas; reflect; and facilitate problem solving. Students encountering language barriers tend to solve problems and think critically by projecting their primary thoughts on visual images rather than words. Students therefore choose visual images to learn new terminology and clarify unclear concepts.

It is recommended that lecturers should keep in mind that inadequate language proficiency could prevent students from understanding the meaning of questions in summative assessment. In addition, feedback on assignments that should have been constructive might be interpreted negatively or incorrectly. This can contribute to low scores in test results. In conclusion, differentiated methods have the advantage of assisting students in clarifying unclear concepts and new terminology. Thus, intervention strategies (scaffolding methods) to assist English second-language (ESL) students could support such students to achieve successful academic results at tertiary institutions. Regular reflection on the success of created and differentiated assignments is important for scaffolding students’ study materials.

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