NORTH-WEST UNIVERSITY
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NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

THINKING SCHOOLS PROJECT

Introduction

The skills and dispositions that are most in demand today and have always been, are communicating with clarity and precision (verbally and written), working collaboratively with others ; the ability to identify, analyze , synthesize and evaluate information, solving problems through creative and critical thinking and the ability to work persistently and accurately. Computers cannot teach any of these skills. Good teachers need to model and mediate these skills and dispositions. Linked to the aforementioned and the teaching and learning policy of the NWU, the envisaged project supports a blended teaching and learning environment that will develop, educate and empower student teachers to become well-rounded graduates who:

- ✓ are able to think laterally and critically, by utilizing a wide variety of teaching modalities;
- ✓ have developed the propensity of skilfully and mindfully applying cognitive tools when confronted with problems; and
- ✓ would be able to instil more thoughtful and intelligent working ways among the learners whom they will teach.

In order to achieve this, teachers need to prepare learners for life after school in the new millennium. An education, which develops knowledge; problem-solving skills; cognitive processes, and intellectual, social and emotional dispositions, is necessary.

Teacher training institutions are thus faced with a challenge to turn the tide and make teacher training more effective, so that teachers will be able to provide education to learners at schools, which is in line with what the new millennium expects of learners. In line with the information mentioned above, the North-West University, Vaal Triangle Campus, decided to embark on the Thinking Schools Project.

In line with the vision of the international thinking schools movement, the School of Education Sciences at the NWU, Vaal Triangle campus, decided to become the first leading teacher training institution in South Africa to advance cognitive education in the teacher-training curriculum formally as from 2012.

The main objective of the Thinking Schools Project at the NWU-Vaal Triangle Campus is:

- ✓ to train in-service teachers to apply and infuse well-established approaches to the teaching of thinking, including reflective questioning, visual mapping, collaborative networking, developing dispositions to learn and think (Habits of Mind), and structuring the environment to nurture the development of thinking.

This will involve:

- ✓ Teaching student teachers how to make better use of their own intellectual resources by enhancing accuracy and persistence as important dispositions (Habits of Mind) to learn and think effectively.
- ✓ Enabling student teachers to become more effective in the application of cognitive processes when they are confronted with academic tasks and challenges.
- ✓ Enabling student teachers to nurture different modes of thinking during their own teaching.

During 2012, 2013 and 2014 the focus was on infusing **Habits of Mind** and **Thinking Maps** into the curriculum of student teachers.

I envisage that the following objectives will be achieved with the use of each of the mentioned teaching strategies:

Teaching strategy: Habits of Mind:

- ✓ Understanding the meaning and value of accuracy and persistence in personal and academic contexts. Becoming alert to work accurately and persistently, and committed to self-assess own growth and development towards becoming sophisticated in the application of accuracy and persistence.
- ✓ Applying strategies to enhance the accuracy of work (to adhere to the use of a checklist with criteria) and to work more persistently (using the elements of a plan to guide task completion (Feuerstein & Hoffman, 1995:33)).

Habits of Mind are important intellectual dispositions for effectively completing learning tasks and solving problems. In essence, Habits of Mind are dispositions that improve thinking and attitudes towards learning. The Habits of Mind refer to the following: being persistent; managing impulsive working ways; listening with understanding and empathy; thinking flexibly; thinking about the own thinking (meta-cognition); striving for accuracy; questioning and posing problems; applying past knowledge to new situations; communicating with clarity and precision; gathering data through all senses; creating, innovating and imagining; finding humour, taking responsible risks, thinking interdependently, responding with wonderment and awe and remaining open to continuous learning.

Teaching strategy: Thinking Maps:

- ✓ Thinking Maps involve the application of the eight important cognitive processes that are required for effective learning by using Thinking Maps as a visual strategy. Thinking Maps is a common visual language or code that represents our thinking patterns or thoughts across any subject field. There are eight maps that each represents a different cognitive/thinking process.

These processes are:

1. Defining in context (to label or to define)
2. Describing qualities, properties, characteristics or attributes
3. To compare or contrast – looking for similarities and differences
4. To classify, categorize and group
5. To identify part-whole relationships
6. To sequence and order
7. To identify cause and effect relationships
8. To identify analogies (simile, metaphor)

Becoming a Thinking School of teacher training has the following anticipated outcomes for student teachers:

Student teachers will be equipped with:
(i) a sound knowledge base; (ii) a wide repertoire of cognitive and meta-cognitive skills and strategies for cognitive processing; (iii) thinking dispositions/habits of mind to cope with demands of the 21st century brought along by technological advances and the explosion of knowledge; (iv) an improved understanding of subject content; (v) examples of how to enrich their own teaching practices to stimulate cognitive growth among learners and (vi) improved academic performance (long-term goal).

All of the aforementioned will enable the student teachers to better equip the learners whom they will teach one day, with the mentioned knowledge, cognitive skills and strategies for cognitive processing, as well as dispositions for effective learning. Furthermore, we envisage that greater motivation among students, increased positive attitudes towards learning; better cooperative learning skills, improved independent learning, and finally higher levels of academic achievement (which is a long-term goal) can be achieved by becoming a Thinking School of teacher education/training.

A recent report on the evaluation of the impact of the Thinking Schools approach since 2005 in 50 UK schools revealed *inter alia* the following positive results:

- ✓ Improvement in the quality of lessons that teachers deliver
- ✓ Greater learner involvement during teaching
- ✓ Improvement in learner attainment
- ✓ Improvement in learners' creative learning and thinking
- ✓ Greater learner involvement in reflection on learning (Bell, 2012).

The NWU project will differ from what others have attempted in the following ways:
Thinking is a key component of most learning and teaching, and teaching is the primary function of all schools. Although the National Department of Education places a strong cognitive focus on teaching and learning since 1997 with the formulation of critical and developmental outcomes that have to be achieved at all levels of education, these outcomes appear not to have become reality in South African classrooms yet.

In order to achieve the goal of becoming a Thinking School of Teacher Education, a whole faculty/school approach was necessary. All staff members at the School of Education Sciences were trained in becoming a Thinking School of Teacher Education during a two-day workshop during October 2011. In addition, a leading authority on Habits of Mind in Australia, James Anderson, trained the entire staff during a two-day workshop during February and September 2011. Staff members were also trained during November 2012 in the application of Thinking Maps. The training to utilise Thinking Hats as a teaching strategy will follow in 2014.

Our approach to teacher training focuses on actively and purposively nurturing thinking dispositions and cognitive processes within subject content and does not deal with the mentioned aspects as separate entities. Furthermore, a whole-school approach that is characteristic of the Thinking Schools movement, will avoid the fragmented approach to the nurturing of cognitive education that characterized cognitive education in the past.

In essence, the approach to teaching and learning as well as data collection that will be followed in the context of the research will be underpinned by the theory of **blended learning** and **assessment as learning.**

Blended learning aims to provide effective instruction and learning by combining different teaching modalities that include face-to-face instruction, e-learning, visual learning, virtual learning, online learning and self-paced instruction. At the heart of blended learning is the importance of a collaborative constructivist process with a community of inquiry at its core. Understanding of knowledge is promoted through social interaction, critical reflection, knowledge sharing and collaboration (Bath & Burke, 2004; Dziuban, Hartman & Moskal, 2004). In addition, blended learning provides opportunities for experiential learning (Kolb, 1984). Concrete experiences will be provided to form a basis for observation and reflection, which is assimilated to conceptualisation and generalisation, which guide the execution of new activities and experiences.

According to Bain (2004:151) *"outstanding teachers use assessment to help students learn, not just to rate and rank their efforts"*. As the development of cognitive processing skills and dispositions is an individual matter that involves personal, self-regulated growth, development and learning (Costa, 2009b:190-191), **assessment as learning** will be used in the context of the research for developmental purposes. Quantitative comparisons of students' performances with one another, is not the focus of this research. Earl (2003:25) contends that through assessment as learning, students are stimulated to assess themselves by questioning their success levels and to consider strategies for possible improvement. By applying assessment as learning on a continuous basis, students will be encouraged to analyse, monitor and evaluate their individual progress in becoming sophisticated in the application of cognitive skills and dispositions. Through assessment as learning it is envisaged that student motivation, reflection and self-assessment will be cultivated to result in the development of independent, self-directed learners. The data collection for assessment as learning will primarily be qualitative in nature. Student development within the student cohort will be gauged by collectively analysing individual student performances for the different self-reflection opportunities in order to identify trends in growth and development.

A strong cognitive focus during teaching and learning combined with a blended learning approach will be adopted to improve the behaviour described in the problem statement. Face-to-face instruction combined with social learning and visual learning during lectures as well as self-paced learning by means of technology (Thinking Maps Software), will be utilized during the implementation of the project.

Cognitive education is often assumed in instruction, but is often not explicit. Our approach to teacher training makes cognitive education explicit. A cognitive focus during teaching, combined with good

blended learning comprises explicit social presence, cognitive presence and teaching presence (Bath & Burke, 2004) that characterize teaching and learning in the following ways:

- ✓ Learners/students need to project themselves socially and emotionally through communication (social presence).
- ✓ Learners/students need to make meaning and confirm meaning through critical reflection and discourse (cognitive presence).
- ✓ Learners/students need to be provided with purposeful activities that stimulate the development of social, emotional and cognitive processes (teaching presence), by employing different teaching modalities (face-t-face, visual).

Student growth and development in terms of the Habits of Mind and the application of cognitive processes will be continuously assessed qualitatively by collecting the following data:

- ✓ Self-reflection by the students three times a year to understand the growth and development in terms of the meaning, value and the strategies linked to accuracy and persistence, and growth in terms of cognitive processing.
- ✓ Submission of Assignments/Tasks twice a year to track the application of accuracy and persistence, and the strategies for cognitive processing.
- ✓ Observing students' practical teaching lessons to find evidence of the application of accuracy and persistence and cognitive processing.
- ✓ Focus group interviews to establish students perceptions on how the infusion of the new teaching strategies might have changed their approach to teaching and learning.
- ✓ Informal discussions, collaboration sessions and interviews with lecturers to establish merits, advantages, problems and suggestions to change the implementation of the chosen teaching strategies.

Although it is important that students learn to track their own growth and development during the implementation of the project, the trends in development and growth across the students will be a focus of our data collection.

Success, effectiveness and impact will be determined by considering the following key performance indicators:

As from 2012 a particular strategy namely, Habits of Mind was infused into the curriculum as a pilot study. The effects were monitored for a period of one year. The merits of the approach that were identified after the first year of implementation, informed the decision to continue with the project and infuse Habits of Mind into the curriculum of all new students across their four years of study. Some of these merits reported during the focus group interviews with students pointed to the following:

- ✓ Greater independence
- ✓ Personal growth
- ✓ More focused working ways
- ✓ Better planning which reduced mistakes
- ✓ Motivation to learn and achieve better
- ✓ Improvement in marks for tasks and assignments

The first important key performance indicator that lecturers address and monitor is that the students firstly understand the meaning and value of the Habits of Mind that will be infused into the curriculum. Secondly, the lecturers will equip the students with strategies to obtain the capacity to apply the different Habits of Mind, and create opportunities for students to monitor their application of the strategies. Thirdly, the lecturers will create conditions for the students to become committed and alert to use the Habits of Mind. During 2012, the focus of the aforementioned referred to improvement in the application of Habits of Mind for being persistent and accurate, which were mainly qualitatively determined by means of student self-reflections and focus group interviews. The same monitoring procedure will apply for the 2013 students. Submission of assignments will also reflect how successful students are in applying the checklist and the elements of a plan. All lecturers monitor this process and submit examples of students' work that serve as data at the end of each semester.

During June/July 2013 a qualitative baseline assessment was conducted to understand how effective the students are in cognitive processing by requesting them to design various Thinking Maps in their different subjects. These maps will *inter alia* be assessed qualitatively in terms of accuracy, complexity, depth and relevancy. As the application of the strategy progresses, students will be afforded opportunities to constantly compare their first efforts of the Thinking Maps with their subsequent efforts to establish personal growth and development. All lecturers will monitor this process and submit evidence of students' first and later attempts at the Thinking Maps at the end of a semester, which will serve as data.

It will also be expected of the students to infuse the specific Habits of Mind/Thinking Maps that are dealt with in each year of their study into their lesson preparation when preparing for workplace-based learning sessions during the four years of study. This is important, as what is done during their training should become part of their own classroom practice. The students' effectiveness in infusing the Habits of Mind/Thinking Maps into their own classroom teaching practice will be assessed by the lectures during the assessment of the students' lesson presentations at schools as from their second year of study.

A quantitative and qualitative baseline assessment of the profile of the Habits of Mind of the 2012 pre-service teachers took place at the onset of the implementation of the Habits of Mind during February 2012. The baseline assessment indicated that the 2012 first year B.Ed.-students are novices in terms of their Habits of Mind, and that purposeful teaching of the Habits of Mind is necessary to transform the application of habits to become more sophisticated. The data collected during the pilot study revealed that the students indeed experience a problem with accuracy and persistence.

Although the quantitative data revealed that the students regarded themselves able to skilled in the application of the accuracy and persistence as Habits of Mind, the open questions proved the opposite. The students' explanations of the meaning and value of accuracy and persistence, and the strategies that they employ to work accurately and persistently, highlighted the following:

- ✓ The student responses revealed a narrow and basic understanding of the meaning of accuracy and persistence.

- ✓ The responses revealed that the students attach a low value to accuracy and persistence and seldom pointed to the value of the two Habits of Mind for academic purposes.
- ✓ The responses also revealed that the students had a limited repertoire of strategies available to work accurately and persistently.

As the completion of the questionnaire revealed that the students were not honest in their responses, the quantitative component was not included in the collection of baseline date for the 2013 first year group, and will also not be included in the collection of baseline data with subsequent groups.

Constant qualitative monitoring of the students' own growth and development in becoming more sophisticated in the application of the Habits of Mind/cognitive processes through their own self-evaluation reports and focus group interviews that will be conducted with them by the project leader, will take place on a continuous basis. Submissions of tasks and assignments at the end of each semester will provide evidence of how successful student teacher is in the application of the Habits of Mind and cognitive processes.

Qualitative improvement in the application of the Habits of Mind/cognitive processes noted by the students' lecturers, will take place on a semester basis by conducting informal discussions/interviews with various lectures across the curriculum throughout the four years of study. The same procedure will apply for the 2013 student group.

As bad Habits take time to break, bad academic habits are no different. Therefore, academic improvement is regarded as a long-term goal of the intervention, and immediate assessment of the students' academic improvement will not take place. It is envisaged that by the end of the third year the Habits of Mind should possibly have led to some gains in quantitative academic improvement.

2.6 Timeline

The first year B-Ed students of 2012 (± 390 students) were exposed to the implementation of **"Habits of Mind" (HoM)** as a teaching strategy/tool as part of a pilot study.

Based on joint decisions by the staff of the School of Education Sciences during a workshop held in November 2011, a number of selected Habits of Mind, critical to the effective completion of academic tasks will be infused across the teacher-training curriculum across the four years of study. All staff members were trained to infuse the Habits of Mind into the curriculum. During 2012, the focus was on enhancing **persistence** and **accuracy** during learning and the completion of academic tasks, and during 2013, the students were exposed to the application of the Thinking Maps strategy. As from 2014, we expected from students to apply the strategies that were modelled and mediated to them during their first two years of study, in their own lessons. All students will therefore be observed during the teaching practice sessions of their third and fourth years of study, to determine how well they embed the strategies in their own teaching practice.

The baseline data collected during the pilot study revealed that the students indeed experience a problem with accuracy and persistence. Although the quantitative data revealed that the students regarded themselves able to skilled in the application of the accuracy and persistence as Habits of Mind, the open questions proved the opposite. The students' explanations of the meaning and value of accuracy and persistence, and the strategies that they employ to work accurately and persistently, highlighted the following:

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As the completion of the questionnaire revealed that the students were not honest in their responses, the quantitative component was not included in the collection of baseline date for the 2013 first year group.

The project is presently coordinated by Prof. Mary Grosser from the School of Education Sciences at the NWU, VTC. Prof. Grosser was trained as a consultant to guide the implementation of a Thinking Schools approach by Thinking Schools International (Kestrel Education) during June 2011 in Swindon, UK, together with another staff member at the School of Education Sciences, Dr Magda Kloppers. Their training enabled them to train additional staff members at the School of Education Sciences in the Thinking Schools approach. The additional trained staff members act as mentors to the various subject groups to assist and support all staff with the application of the various thinking strategies (Dr Stef Esterhuizen (Foundtion Phase), Mr Byron Bunt (Social Sciences), Mrs A Petzer (Accounting, Economics and Business Management), Dr Mirna Nel (Languages, Life Orientation), Dr Magda Kloppers (Mathematics, Natural Science, Technology, Computer Science). Prof Grosser also acts as mentor for the staff members involved in teaching the Education and Professional Studies modules, and Prof. B.J.J. Lombard is responsible for the assessment as learning component that is utilised to determine the growth and development of the dispositions and cognitive processes among the students.

For a recent update on the latest findings of the project, see the IACESA 2015 symposium presentation under the conferences tab entitled: Budding...blooming...reaping...bearing fruit: does the explicit teaching of thinking really work.

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