ANTON DE KOM UNIVERSITEIT VAN SURINAME

INSTITUTE FOR GRADUATE STUDIES AND RESEARCH (IGSR)

Efficacy Beliefs and Context Beliefs of pre-service and In-service Biology Teachers of the Teacher Training Institute (IOL) in Suriname

Master Thesis Biology Education

Deborrah K. Feurich (10BI1006)
August 14th 2014

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Preface

Long has been my journey towards the completion of my study. It has taken me along many valleys and hilltops towards this destination, but I wouldn't change one step of it because it has made me the person and the educator I am today! As a college student I experienced a lot of frustrating years due to a lack of study skills. Little by little through trial and error and by picking up tips from fellow students I gained some semblance of study skills which finally got me through college. From there on, with my new found 'study skills', my journey became relatively easier. But as I gained more knowledge and experience I also became more aware that there was something lacking! Why did my journey suddenly seem easier? This question would remain unanswered for more than ten years after graduating when I applied for a teaching job at a high school and stepped into the role of educator and molder of young minds. This is where I met my college tormentor again but now through the experiences of my students. I noticed that the majority of my students lacked study skills especially with regard to biology. Alas all my efforts, albeit with good intentions, to help them improve their study skills were to no avail! With no one to turn to for advice and questioning my efficacy as an educator and molder of young minds I continued my efforts at college level but saw little improvement! My awakening moment came when I was accepted as a full-time teacher educator at the Advanced Teacher Training Institute (IOL). Here I gained the much needed skills to wage war against my old nemesis. I had learned a lot during my journey and with my newly gained knowledge, skills and improved efficacy beliefs I felt more equipped to develop ways in which I could help those of my students who struggled with poor studying skills. I felt that I could now make a difference and help students where there was no help for me. This thesis represents one of the first official steps in my endeavor to help pre-service teachers (and students in general) to improve their study skills!

As I mentioned earlier I had some help along the way and therefore I would like to thank the following people: God for giving me wisdom and compassion; my family for their never ceasing support; my children for their patience with a working and studying mother; my students who participated in the study and finally my supervisors for their feedback.

Paramaribo, August 2014
Deborrah K. Feurich

Abstract

Educational research has always focused around the central theme of improving the quality of education. For years various governments and policy makers in Suriname have recognized the importance of education for the development of Suriname. Many educational projects have already been initiated and carried out by both the government and the private sector, to improve the quality of our education both intrinsic and structurally. The purpose of many of these projects is to improve the quality of teacher performance which will hopefully result in better performance of the students. Teachers are the axis of every educational system and the success or failure of educational projects depends on the quality of their performance. The purpose of this study is to assess the efficacy beliefs of pre-service biology teachers of the Advanced Teacher Training Institute (IOL) in Suriname. This study has shown that even though the quantitative results showed little or no significant difference in the self-efficacy beliefs between the school years of the teacher training, the quantitative results suggested that all the pre-service biology teachers more or less experienced an increase in their sense of self-efficacy during their teacher training. The study also indicated factors which according to the pre-service biology teachers enhanced their sense of self-efficacy and factors which were seen as obstacles to the development of their self-efficacy. Future studies should therefore focus on enhancing the sense of self-efficacy of our teaching staff by looking for ways to minimize the factors which could hinder the development of the self-efficacy of pre- and in-service teachers and optimizing the factors that have a positive influence on their sense of self-efficacy.

Abstract (Dutch)

Onderzoek in het gebied van educatie heeft zich altijd gefocused rond het thema "verbetering van de kwaliteit van het onderwijs". Ook in Suriname wordt door de verschillende beleidsmakers al jaren de noodzaak ingezien van kwalitatief hoogwaardig onderwijs voor de ontwikkeling van het land. Zowel de overheid als de particuliere sector heeft hierop ingespeeld d.m.v. het uitvoeren projecten die beoogen het onderwijs in Suriname zowel structureel als inhoudelijk te verbeteren. Vele van deze projecten hebben als doel het verbeteren het functioneren van het onderwijzend personeel in de hoop dat daardoor ook de leerlingen beter zullen presteren. Aan de basis van van elk onderwijssysteem ligt het onderwijzend personeel die een grote rol speelt in het slagen of falen van elk ondernemen t.b.v. een verbetering van de kwaliteit van het onderwijs in Suriname. Het doel van deze studie is het inschatten van het gevoel van zelfwerkzaamheid van de biologie Leraren in Opleiding van het Instituut voor de Opleiding van Leraren (IOL) in Suriname. Uit de kwantitatieve data van de studie is geen of slechts een beperkte stijging in het gevoel van zelfwerkzaamheid gebleken. Uit de kwalitatieve data bleek echter dat alle Leraren in Opleiding van de opleiding Biologie het gevoel hadden dat hun gevoel van zelfwerkzaamheid tijdens hun opleiding in meer of mindere mate is toegenomen. Er werden zowel factoren genoemd die het gevoel van zelfwerkzaamheid hebben bevorderd en factoren die werden ervaren als belemmering voor de ontwikkeling van de zelfwerkzaamheid. Vervolg studies en interventies zouden zich daarom in het bijzonder moeten richten op het bevorderen van het gevoel van zelfwerkzaamheid van het onderwijzend personeel, door de factoren die een positieve invloed hebben op het gevoel van zelfwerkzaamheid te bevorderen en de factoren die een negatieve invloed hebben op de ontwikkeling van het gevoel van zelfwerkzaamheid te minimaliseren.

List of abbreviations

IOL	Advanced Teacher Training Institute
BTEBI	Biology Teaching Efficacy Instrument
BTEBI-B	Biology Teaching Efficacy Instrument B
BTOE	Biology Teaching Outcome Expectancy
CBATS	Context Beliefs about Teaching Science
CSE	Collective School Efficacy
Escale	Efficacy scale
moA	Junior level of teacher training
moB	Senior level of teacher training
moA1	First year of junior level of teacher training
moA2	Second year of junior level of teacher training
moA3	Third year of junior level of teacher training
moB1	First year of senior level of teacher training
moB2	Second year of senior level of teacher training
Oescale	Outcome expectancy scale
PCK	Pedagogical Content Knowledge
PBTE	Personal Biology Teaching Efficacy Beliefs
PSTE	Personal Science Teaching Efficacy Belief
STEBI	Science Teaching Efficacy Belief Instrument
STEBI-B	Science Teaching Efficacy Belief Instrument
STOE	Science Teaching Outcome Expectancy
TTI	Teacher Training Institute

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1 INTRODUCTION

Most teachers often ask themselves the question, "What makes a good teacher and what capacities do teachers need to be good teachers?" C. A. Grant (2008) defines teacher capacity as a teacher's knowledge, skills and disposition . C. A. Grant further states that as time and context change, as events with wide-ranging consequences occur, and as developments in science lead to technological advancements, society and government make demands for standards and accountability that require teachers not only to keep pace with the change, but to lead the change. This, in turn, has required the definitions of teacher capacity to be altered and amended. For example, in order for students to meet curriculum/performance standards and for schools to meet accountability requirements, teachers' knowledge has to become deeper and more flexible. This now includes having an understanding of the relationship between content knowledge and pedagogical content knowledge (PCK) (Shulman, 1986). Teacher capacity must also include such essential skills as having a wide array of grouping strategies and assessments techniques. In addition, teachers must have dispositions that foster positive attitudes towards change as well as a commitment to student learning. They must also be committed to the basic assumption that all students can learn.

But how can pre-service and in-service teachers develop their capacities to meet the additional requirements of the altered and amended definition of teachers' capacities? In order to answer this question we first need to have a clear understanding of the separate components of teachers' capacities as defined by C. A. Grant (2008). Much research has already been done on teaching and teacher education.

Since the mid-1980s, research on teaching and teacher education has shifted dramatically from a focus on behaviors to an interest in cognition (Richardson, 1996) with the recognition that, teachers' ways of thinking and understanding are vital components of their practice (Clark & Peterson, 1986; Nespor, 1987).

According to Richardson (1996), this shift in focus from behaviors to cognition includes important concepts, such as attitudes and beliefs, for a better understanding of teachers' thought processes, classroom practices, change, and learning to teach. Richardson (1996) further states that in the last three decades teachers' beliefs in particular have gained prominence in the education literature. The importance of research into teachers' beliefs as a way to inform educational practice had already been emphasized by Pajares in 1992. According to Irez (2006) if we assume that beliefs are the best indicators of the decisions

individuals make throughout their lives, then teachers' beliefs will also affect their planning, decision-making, and subsequent classroom behavior.

Understanding teacher capacities and looking for ways to develop these capacities is also important in the education of pre-service and in-service biology teachers. Investigating the beliefs of pre-service and in-service biology teachers with regard to their capacities in teaching biology will be the focus of this study.

2 THEORETICAL FRAMEWORK

2.1 Teachers' beliefs

Kennedy (1997) stated that teachers and teacher candidates have strong beliefs about the role that education can play, about explanations for individual variation in academic performance, about right and wrong in a classroom, and many other areas. Kennedy also asserts that these beliefs are used to evaluate the new ideas about teaching that teachers and teacher candidates confront in their methods classes. Those beliefs are thought to be the best indicators of the decisions people make throughout their lives. Teachers of science possess beliefs regarding their professional practice which may in turn, impact student learning. Beliefs are defined as personal constructs that can provide an understanding of a teacher's practice (Nespor, 1987; Pajares, 1992; Richardson, 1996). Thus, in order for pre-service and in-service teachers to work on their own development in becoming become successful educators, who in turn have an substantial impact on their students' learning, they first have to be aware of their own beliefs about teaching including teaching biology.

As stated by Bybee (1993), teachers develop their beliefs about teaching from their years spent in the classroom as both students and teachers. However, this is no guarantee for consistency between the beliefs of teachers and the literature about best practice in teaching. Bybee (1993) further stated that teachers' beliefs appear to be stable and resistant to change. According to Bandura (1997), beliefs are thought to be the best indicators of the decisions people make throughout their lives. In educational research literature, the concept of teachers' beliefs has been defined in various ways. According to Oliver and Koballa (1992), beliefs are often equated with knowledge, attitudes, and personal convictions, or reflect a person's acceptance or rejection of a proposition. They also state that beliefs are often confused with other related concepts such as attitudes, values, judgments, concepts, and dispositions. Pajares (1992) clarified the confusion by explaining that clusters of beliefs around a particular situation form attitudes, and attitudes become action agendas that guide decisions and behavior. Thus, according to Pajares (1992) the way people act can be largely attributed to what they believe. This was already underscored by Ajzen (1985) who stated that connections among clusters of beliefs create an individual's values that guide one's life and ultimately determine behavior (Ajzen, 1985). Naturally, biology teachers also possess beliefs regarding their professional practice, and since beliefs may affect actions, teachers' beliefs play a critical role in the education of biology pre-service and in-service teachers.

One difficulty in exploring the literature on pre-service teachers' beliefs lies in the multitude of definitions of beliefs (Pajares, 1992.) In order to understand the concept of teachers' beliefs, it is important to clearly define and understand what is meant by teachers' beliefs.

2.1.1 Sources and development of teacher beliefs

According to Richardson (1996), there are three major sources of teacher beliefs: personal experience, experience with schooling and instruction, and experience with formal knowledge which includes knowledge with regard to school subjects and pedagogical knowledge. Other sources of teacher beliefs according to Kukari (2004) are the spoken dialect and the cultural and religious practices of teaching and learning. He also found that these aspects influence each other and that they define and fashion the perceptions pre-service teachers have of teaching and learning prior to becoming students of teaching.

Research in the area of former experience with schooling and instruction as a source of teacher beliefs supports the view that teacher beliefs may develop as a result of years spent as a student watching and participating in classroom interactions (Feiman-Nemser et al., 1989; Gunstone, 1989; Mertz, 1991; Joram & Gabriele, 1998). This view is shared by many other researchers. For example Lortie (1975) describes this as the apprenticeship of observation, wherein one's past observations of teachers in the context of the classroom influence one's conception of what it means to be a teacher. According to Florio-Ruane, S. & Lensmire, T.J. (1990), after spending twelve to thirteen years as observers in their pre-college education, pre-service teachers enter their college education with a set of educational beliefs which may or may not be congruent with what teacher educators hope their students will learn.

During their period as classroom observers they developed their own personal theories and powerful conceptions about teaching and learning, with which they enter their teacher training courses (Dart *et al.*, 1998).

2.1.2 Teacher beliefs in teacher education

In earlier studies it was already suggested that pre-service teachers' entry beliefs and perceptions strongly influence both the way they view the theoretical components of teacher training (Crow, 1987; Clark, 1988; Holt-Reynolds, 1992) and the teaching behaviors during field experience (Goodman, 1988). According to Hollingsworth (1989) and Powell (1992), these entering beliefs and conceptions act as filters through which pre-service teachers interpret their teacher education and classroom experiences. Entering beliefs have also been

shown to affect what pre-service teachers learn from teacher education and how they learn from it (for summaries, see Calderhead & Robson, 1991; Borko & Putnam, 1996). An additional challenge is that pre-existing beliefs are so influential that attempts to change teaching styles are ineffective, unless these beliefs are directly questioned (Johnson, 1988; O'Loughlin, 1988). Moreover, beliefs that were formed and structured early in one's life and were assimilated into the overall beliefs structure can greatly affect the interpretation of new experiences. According to Pajares (1992), the earlier a belief is incorporated into the belief structure, the more difficult it is to alter. So But if entering beliefs have such a great impact on teacher education what can be done to influence these beliefs?

It has been suggested by a growing body of research that not only must teacher educators address issues of course structure, content and articulation in improving teacher education, they must also take into account the beliefs, attitudes, expectations and perceptions that pre-service teachers bring with them prior to the teacher education program and how they develop during their training years (Pajares, 1992). The first step in the professional development of pre-service teachers is pre-service education which exposes them to new perspectives and prepares them in knowledge and skills (Wilke, 2004). Knowledge includes disciplinary content, or subject knowledge, as well as pedagogical content knowledge or knowledge of how to teach (Wilke, 2004), and this forms the basis for quality practice (Schempp, 1995).

Pedagogical knowledge can be defined as *"…the content, skills, and strategies required for effective teaching*" (Gerges, 2001, p.72). Pedagogical knowledge is closely linked to teacher belief in that there are factors that influence teachers' attitudes and beliefs toward the implementation of various instructional models and strategies (Chong et al., 2005).

2.1.3 Pre-service teachers' beliefs about teaching and the teaching profession

Perceptions and expectations about what it takes to be an effective teacher are two aspects of beliefs about teaching which, according to Pajares (1992) are formed before pre-service teachers enter the teacher training program. Upon entering the teacher training program, pre-service teachers will have vivid images of teaching from their past experience as students and preconceived beliefs about the characteristics of good teachers. These beliefs are formed early and remain consistent during their teacher preparation (Murphy , Delli & Edwardset al., 2004).

Upon entering their teacher training program, pre-service teachers also have simplistic views of the teaching profession (Whitbeck, 2000). Most of them believe that teaching is easy and that teaching merely involves transmitting information (Feiman-Nemser et al., 1989). Because of these misguided beliefs, many pre-service teachers enter the program with high confidence in their ability to perform well in the profession (Richards & Killen, 1994).
Some research studies have even shown that upon entering the teacher training program, pre-service teachers hold the belief that good teaching is [solely] related to content knowledge and the ability to communicate that knowledge to their students (Hollingsworth, 1989; Powell, 1992)

In his Motivation Systems Theory, Ford (1992) proposes that a persons' competence in any given area (i.e.,including [biology] teaching) is the result of a combination of a person's motivation, his skills, and the environment. Ford (1992) further clarified that a persons' motivation comprises goals and personal agency beliefs. Goals "*are thoughts about desired states or outcomes that one would like to achieve*" (p. 248), and personal agency beliefs are evaluative beliefs whereby a person compares his goals with the consequences of his pursuit of those goals.
Ford (1992) stated:
…personal agency beliefs play a particularly crucial role in situations that are of the greatest developmental significance - those involving challenging but attainable goals. Consequently, they are often key targets of intervention for parents, teachers, counselors, and others interested in promoting effective functioning. (pp. 124-125).

In Ford's theory, two types of personal agency beliefs are identified: capability beliefs and context beliefs. Capability beliefs can be compared to Bandura's (1997) concept of self-efficacy. Capability beliefs are beliefs someone has about his ability or skill to meet a particular goal. In the context of this study, capability beliefs will be characterized as a teacher's belief that he or she can effectively teach [biology]. Bandura further defined outcome expectancy beliefs as a related belief construct. He stated, "*…outcome expectation is a judgment of the likely consequences such performances will produce*" (1997, p. 21). For a pre-service teacher, this would be the belief that if he teaches [biology] effectively, then students will learn [biology].

Context beliefs - sometimes called perceptions of control - are similar to Ajzen and Madden's (1986) perceived behavioural control construct and Bandura's (1997) outcome expectancy construct. Context beliefs look at the brother broader picture and could be defined as the influence of the entire context in meeting desired goals. In the case of [biology] teaching, context beliefs would not only encompass the students, but also parents, other teachers, administrators, institutions, organizations, and the physical environment. In the field of education, the context can be classified in a broad sense as the designed environment (*e.g.*, buildings, equipment), human environment (*e.g.*, students, faculty, parents), and socio-cultural environment (*e.g.*, policy, cultural norms) (Ford, 1992).

2.2 Teachers' efficacy beliefs

Research on teacher efficacy has indicated that teacher with a high sense of efficacy devote more time to academic instruction when compared to those with a low sense of efficacy (Gibson & Demo, 1984) and take greater responsibility for educating students with learning difficulties (Soodak & Podell, 1993). In addition, Czerniak and Lumpe (1996) noticed that levels of science teaching efficacy were found to be related to science teaching anxiety and the instructional strategies. In fact, highly efficacious teachers are more likely to use open-ended, inquiry, student-directed teaching strategies, while teachers with a low sense of efficacy are more likely to use teacher-directed strategies such as lectures and reading from the textbook. In summary, teacher efficacy has been linked to teachers' classroom behaviors, their openness to new ideas, and their attitudes toward teaching (Tschannen-Moran et al., 1998). In other words, teacher efficacy has been shown to positively influence teachers' classroom behaviors. This then would also be true for biology as a science subject. In other words, positively influencing biology teachers' efficacy would positively influence their classroom behaviors.

2.2.1 Self-efficacy and outcome expectancy beliefs

The conceptualization of teacher efficacy has been based on Bandura's (1977) theory of elementary school teachers' self-efficacy. Bandura (1982) defines self-efficacy as judgments of how well one can execute courses of action required to deal with prospective situations. In his theory, Bandura (1977) theorized that behavior is based on two sources; outcome expectations and self-efficacy expectations. He defined outcome expectancy as a person's estimate that a given behavior will lead to certain outcomes, whereas an efficacy expectation

is the conviction that one can successfully execute the behavior required to produce the outcomes. Bandura (1982) suggested that in any given instance behavior would be best predicted by considering both self-efficacy (belief that one has the necessary skills to achieve the outcome) and outcome expectancy (belief that behavior will lead to desirable outcomes). Bandura (1977) hypothesized that people with both high outcome expectancy and self-efficacy will act in an assured, decided manner. Low outcome expectancy paired with high personal efficacy may cause individuals to temporarily intensify their efforts but eventually lead to frustration.

Persons low on both variables will give up more readily if the desired outcomes are not reached immediately. If this is true, then by measuring the self self-efficacy and the outcome expectancy beliefs of pre-service teachers during their teacher training as, for instance, biology teachers, we could detect deficiencies in their beliefs with regard to teaching biology at any moment during their training. This would allow us to adjust the teaching program at any moment during their training to accommodate their needs and minimize frustration and possibly reduce the percentage of potential drop-outs.

Bandura's self-efficacy theory (1977) was based on elementary science teachers' overall level of self-efficacy and thus may not accurately reflect their more specific belief about their ability to affect science teaching and learning. Thus, Riggs & Enochs (1990) developed an instrument by using Gibson & Dembo's (1984) Teacher Efficacy Scale to specifically assess the self- efficacy and outcome expectancy beliefs of in-service and pre-service elementary science teachers; the Science Teaching Efficacy Belief Instrument (STEBI). Consistent with Gibson & Dembo (1984), they have found two distinct dimensions, the first of which was named *Personal Science Teaching Efficacy Belief* (PSTE) scale, while the second was named *Science Teaching Outcome Expectancy* (STOE) scale. Note that the STEBI instrument was developed for elementary teachers to specifically assess science teachers' efficacy beliefs.

In their research to further extend their understanding of elementary teachers' sense of efficacy, Enochs & Riggs (1990) found that teachers with a higher sense of PSTE devoted more time to teach science in comparison to teachers with a low sense of PSTE. Furthermore, a higher sense of PSTE among elementary teachers was related to more humanistic orientations toward control or management in classroom and these pre-service teachers were most capable of activity-based science teaching (Enochs et al., 1995). The same researchers also reported that science teachers with a high sense of self-efficacy, believe in their ability to

teach science and they also believe that students can learn science if instructed effectively (Enochs et al., 1995). Thus, Riggs &Enochs (1990) suggested that teacher educators must be aware of their students' beliefs and should plan ahead for experiences which will have a positive impact on their students' self-efficacy and outcome expectancy beliefs. By placing the burden of improving [biology] education on teachers and teacher education programs, it is important to examine teachers' self-efficacy beliefs. The investigation of pre-service teachers' self-efficacy beliefs is an important key in understanding how to increase teachers' sense of efficacy in teacher education programs, to motivate teachers to teach biology, and to have effective biology teaching in the high schools.

2.3 Teachers' Context beliefs

Bandura (1997) outlined a broadened view of efficacy which is similar to Ford's idea of context beliefs. He called this broadened view Collective School Efficacy (CSE). To move the focus from teachers' beliefs about their own teaching ability to the more broadened view of Collective School Efficacy, Bandura argued that the total school environment has an effect on the teachers' beliefs since teachers do not operate in isolation. He further stated that the factors which influence this collective school efficacy include administrative support, student and teacher characteristics, and parental involvement.

In their theory of planned behavior, Ajzen & Fishbein (1980) emphasized the context specificity of beliefs. They stressed that beliefs are specific with respect to all of context (*i.e.*, place, action or behavior, time and subject). Green (1971) also asserted the relevance of context to the enactment of beliefs. He suggested that the relative strength with which various beliefs are held depends upon the particular context.

Contextual constraints have also been recognized to exert a substantial influence on the relationship between beliefs and practice (Sullivan & Mousley, 2001). In fact Sullivan & Mousley (2001) depicted the relationship between beliefs, practice, and constraints as a triangle with two-way interactions between each pair of elements and, in her meta-analysis of case-studies on the relationship between teachers' beliefs and practice, Hoyles (1992) described all beliefs as situated. That is, all of a teacher's beliefs are constructed as a result of experiences which necessarily occur in contexts. Hoyles (1992) argued that it is thus meaningless to distinguish between espoused and enacted beliefs or to examine the transfer of beliefs between contexts, since different contexts will, by definition, elicit different beliefs. Thus, rather than contextual factors constraining teachers from implementing certain of their

beliefs, such factors in fact give rise to different sets of beliefs which are indeed enacted. Such a view is consistent with that of Ajzen &Fishbein (1980). Pajares (1992) also stressed the contextual nature of beliefs and the implications of their being held, not as isolated entities, but as part of belief systems as described by Green (1971).

Context is thus relevant to both the development and the enactment of teachers' beliefs, as well as to the particular beliefs that are relevant (and hence likely to be espoused and/or enacted) in a given situation (Beswick, 2003).

2.4 Instruments

In order to get a broader picture of the efficacy and context beliefs of the pre-service teachers of the Advanced Teacher Training Institute (IOL) a combination of three instruments was used namely: an adapted version of the Biology Teaching Efficacy Instrument (BTEBI) from Ayşe sa vran & Jale Çakiroglu (2001), an adapted version of the Context Beliefs about Teaching Science (CBATS) instrument from Lumpe et al. (2000) and a focus group.

2.4.1 The STEBI-B instrument

Enochs & Riggs (1990) developed the Science Teaching Efficacy Belief Instrument (STEBI-B) to measure science teaching self-efficacy and outcome expectancy in pre-service elementary teachers. The STEBI-B is based on Bandura's (1977) self-efficacy theory and since its development in 1990, has been used in studies to measure science teaching self-efficacy.

Bandura's (1977) self-efficacy theory suggests that behavior can be predicted by considering two factors. According to the first factor people [e.g. pre-service teachers] will be motivated to perform an action if that action is believed to have a favorable result. This is known as outcome expectation. The second factor is self-efficacy expectation and is the belief that an action can be performed successfully. If we analyze these two factors it is thought that we can predict behavior. The two scales that make up the STEBI-B are the Personal Science Teaching Efficacy (PSTE) belief scale and the Science Teaching Outcome Expectancy (STOE) scale. These were designed to be used with pre-service elementary school teachers as an accurate predictor of science teaching behavior.

2.4.2 The Biology Teaching Efficacy Belief Instrument (BTEBI)

To specifically measure the biology teaching efficacy beliefs of pre-service elementary teachers the Biology Teaching Efficacy Belief Instrument (BTEBI) was modified from the Science Teaching Efficacy Belief Instrument Form B (STEBI-B) developed by Enochs & Riggs (1990) for pre-service elementary teachers. The BTEBI was used in the study of Savran, A., & Cakıroglu, J. (2001) and included the following modifications: removal of one item from the original instrument and substituting "science" for "biology". The final form of the BTEBI consists of 22 statements, 13 positively-written and 9 negatively-written. As in Enochs & Riggs' instrument, the BTEBI is comprised of two subsca1es; the first subscale measures Personal Biology Teaching Efficacy Beliefs (PBTE or Escale) and is comprised of 12 items, whereas the other subscale measures Biology Teaching Outcome Expectancy (BTOE or Oescale) and is comprised of 10 items. The PBTE corresponds with the PSTE of STEBI-B and BTOE corresponds with STOE of the STEBI-B. The BTEBI has a 5 choice Likert-scale ranging from strongly agrees to strongly disagree. Scoring was accomplished by assigning values to the answer choices. For the positively worded items 5 point were awarded to "strongly agree" down to 1 for "strongly disagree". For the negatively worded items the scores were reversed, 1 for “strongly agree” up to 5 for “strongly disagree”.

For this study an adapted version of the BTEBI was used namely the BTEBI-B. The adaptations of the BTEBI-B consisted mainly of translating the items of the BTEBI instrument from English to Dutch and reintroducing the original item 3 from the STEBI instrument.

2.4.3 Contexts Beliefs about Teaching Biology (CBATB) instrument

For this study an adapted version of the Context Beliefs about Teaching Science (CBATS) instrument from Lumpe et al. (2000) was used. The purpose of the Lumpe et al. (2000) study was to develop and apply an assessment strategy designed to gauge teachers’ beliefs about the potential influence of specific environmental factors on their science teaching behaviors. The original instrument consist of two columns; “factors that would *enable* me to be an effective teacher” (column 1) and “the likelihood that these factors will *occur* in your school” (column 2).

For this study only the first column of the original instrument was used because the items mentioned in the first column can be associated with the beliefs in-service biology teachers have of the role the entire context plays in achieving the expected outcome. Further

adaptations of the instrument were the translation of the first column into Dutch, substitution of the word biology for science and the division of the items into four categories. The four categories are: micro- and intermediate-category, macro-category, materials and professionalism. The micro and intermediate category consists of items with regard to educational context on a micro and intermediate level such as the planning, preparation and execution of the classes and the cooperation between colleagues, school management and parents. The macro-category consists of items on a brother scale e.g. national education guidelines and the involvement of related parties and the Ministry of Education. The items under the category materials have to do with teaching supplies, technological hard and soft ware and the physical aspects of the teaching environment. The final category was professionalism and consisted of items with regard to the professionalization of teachers.

2.4.4 Focus group

The quantitative data collected with the BTEBI-B instrument could only give us a measure of the pre-service and in-service teachers' efficacy at a certain moment during their training. It could not however give us any information on *how* their efficacy beliefs developed during their teacher training, which factors *contributed to* or were seen as *obstacles* for the development of their efficacy.

For this reason in addition to quantitative data, a focus group was used to collect qualitative data specifically with regard to the development of the efficacy beliefs of the pre-service and in-service teachers of the senior level of the teachers training (moB) who were enrolled for the school year 2013-2014.

The method used for the focus group was mini focus groups with a respondent moderator for each group.

3 PURPOSE

In order to investigate factors that may have an impact on pre-service teachers' belief system and their sense of confidence in relation to their ability to be successful teachers, many studies have used self-efficacy as a tool (Tschannen-Moran et al., 1998). Teacher efficacy has been shown to have a positive influence on teachers' classroom behaviors. For example, according to Gibson & Dembo, (1984) research on teacher efficacy indicated that, relative to teachers with a low sense of efficacy, teachers with a high sense of efficacy devote more time to academic instruction, and according to Soodak & Podell (1993) they also take greater responsibility for educating students who have difficulty learning. In addition, Czerniak &Lumpe (1996) noticed a relationship between the levels of science teaching efficacy, science teaching anxiety, and the instructional strategies that were used. Likewise, Tschannen-Moran et al. (1998) argued that teacher efficacy is linked to teachers' classroom behaviors, their openness to new ideas, and their attitudes toward teaching.
If then an increase in self-efficacy with regard to teaching biology can lead to activities which enhance teaching performance, then one of the main purposes of a teachers training institute should be to develop the efficacy beliefs of pre-service and in service teachers!
As stated earlier by Riggs &Enochs (1990) "*The investigation of pre-service teachers' self-efficacy beliefs is the important key in understanding how to increase teachers' sense of efficacy in teacher education programs, to motivate teachers to teach biology, and to have effective biology teaching in the high schools*."

The purpose of this study is to assess pre-service and in service biology teachers' efficacy and context beliefs with regard to teaching biology, and how these beliefs compare between the school years and levels of the training as they gain more knowledge and experience during their training at the teacher training Institute (IOL) in Suriname. Furthermore, this study examines possible correlations, between in-service biology teachers' sense of efficacy beliefs regarding biology teaching, school year, and teaching experience.

The main study question is as follows: *"What are the efficacy and context beliefs of the pre-service and in-service biology teachers of the Advanced Teacher Training Institute (IOL) of Suriname with regard to teaching biology?"*

The three aspects of this study can be formulated in the following questions:

-"*How do the outcome expectancy beliefs of the pre-service and in-service biology teachers of the Advanced Teacher Training Institute (IOL) of Suriname, with regard to teaching biology, compare between school year and teaching experience?"*

-*"How do the self-efficacy beliefs of the pre-service and in-service biology teachers of the Advanced Teacher Training Institute (IOL) of Suriname, with regard to teaching biology, compare between school year and teaching experience?"*

-*"Which factors mentioned in the context beliefs instrument have the most influence on the self-efficacy and outcome expectancy beliefs of the in-service teachers of the Advanced Teacher Training Institute (IOL) of Suriname participating in this study?"*

3.1 Advanced Teacher Training Institute (IOL)

The participants from the research group were enrolled at the Advanced Teacher Training Institute (IOL) which is a teacher training institute for high school and junior college biology teachers. The training of biology pre-service teachers consists of two levels; a junior (moA) and a senior (moB) level. The junior level has three school years namely moA1, moA2, moA3 and trains pre-service and in-service teachers for high school. The senior level has two school years namely moB1 and moB2 and trains pre-service and in-service teachers for junior college. During the first year of the senior level the theoretical courses are taught and during the second year the students have to do their research.

The research study group consisted of pre-service biology teachers without teaching experience and pre-service biology teachers who already had teaching experience at an elementary school. The pre-service biology teachers with experience at elementary level are listed in this study as in-service teachers to distinguish them from the pre-service teachers without any teaching experience.

4 MIXED METHODS

4.1 Approach and adaptation instruments

A mixed methods approach with an embedded design according to Creswell J. W. (2003) was used for this study. This approach was chosen because of the following reasons:

- The quantitative data collected at the end of the second semester could give us an overview of the teachers' self-efficacy beliefs at a certain moment.
- Furthermore, from the quantitative data only the difference in efficacy between the different levels of the teacher training could be derived.
- To obtain more insight into possible explanations for the results from the quantitative data, qualitative data. were also collected.
- Information concerning problem areas might become visible that could be useful for the improvement of the quality assurance in educating and in the coaching of successful biology teachers.
- This qualitative information could provide additional information that can be used for further studies concerning the efficacy and context beliefs of our biology pre-service and in-service teachers.

For the quantitative part of this study, an adapted version of the BTEBI (Ayşe sa vran and Jale Çakiroglu, 2001) and an adapted version of the "[Context] Beliefs about Teaching Science" (Lumpe, 2000) were used. The quantitative data consisted of demographic information of the respondents, data concerning their self-efficacy and outcome expectancy beliefs, and data about their context beliefs with regard to teaching biology. Qualitative data were also derived from the adapted version of "[Context] Beliefs about Teaching Science" (Lumpe, 2000), and additional qualitative data were obtained from a focus group of senior biology students (moB) who enrolled for the school year 2013 - 2014.

4.1.1 BTEBI-B instrument

Data collection with the BTEBI-B questionnaire was done at the end of the second semester of the school year 2012-2013. In this way, the collected data could also be used as a final evaluation of the past school year. Data were collected from both levels of the training program.

The efficacy beliefs questionnaire had a linkert-scale scoring system with five options ranging from strongly agree (SA) to strongly disagree (SD). The answers were quantified and

incorporated in an SPSS 19 file. The negatively worded items were quantified oppositely from the positively worded items before analyzing the data. After the data were collected the instrument was analyzed for reliability using Cronbachs' Alpha. Paired samples tests and independent samples tests were also done. The data of the BTEBI-B instrument were analyzed for each school year. The data of the subscales (PBTE and BTOE) were analyzed separately for each of the school years (levels) mentioned above. The results of the analysis were then compared for differences in the efficacy and context beliefs with regard to teaching biology between the pre-service and in-service teachers.

4.1.2 Context beliefs instrument

Data collection with the adapted context beliefs instrument was done simultaneously with the BTEBI-B instrument as a final evaluation at the end of the school year. Data were collected from both levels, junior (moA) and senior (moB), of the teacher training program. The context beliefs instrument had a linkert-scale scoring system with four options ranging from strongly agree (SA) to disagree (D). The scores from the linkert scale were quantified as follows: Strongly agree (1), agree (2), uncertain (3) and disagree (4).

The items from the Context beliefs questionnaire were divided into four categories before analyzing the data, viz. micro and intermediate, macro, materials, and professionalism. Because there were only three items in the category 'professionalism' (professionalizing the teachers, support, and coaching programs for the teachers and more fundraising), the categories 'micro- and intermediate' and 'professionalism' were combined. The division of the items into categories was done in order to analyze the reliability of the instrument more accurately and to enable drawing more specific conclusions.

After the data were collected the categories of the instrument were analyzed for reliability using Cronbachs' Alpha. A Pearsons' correlation was also done for the four categories of the context beliefs instrument.

4.1.3 Focus group

The participants of the focus group were divided into five mini focus groups each consisting of four to five members depending on the number of participants present and the composition of the groups. Special attention was given to making separate groups of pre-service teachers with and without teaching experience. This was done to minimize the reactive effects. The mini focus groups were mixed with regard to gender, ethnicity, and age.

The members from each group chose one member to act as moderator during the assignment. Each moderator received a list of items to be discussed. The mini focus groups each had ten minutes of discussion time for each item of discussion. After discussing all the items each member first wrote down his or her individual experience.

Next, the individual experiences were compared among the group members and the individual experiences were arranged in order of importance. This was written on a flysheet and pinned to the wall.

At the end of the session a member of each group gave a short presentation (about 3 minutes) in which the results of their discussion were synthesized into one group view.

After all the groups had given their presentations the results were compared and together with the students a priority list was made of the presented items. Finally, two students were asked to share their experience with the assignment and what they had learned from it.

5 RESULTS

5.1 Demographics

The participants in this study comprised 163 students (pre-service and in-service teachers) of the Biology department of IOL who had enrolled for the school year 2012 – 2013. In total 118 (72.394%) of the questionnaires were returned.

Table 5.1. Demographic characteristics of the study group

	School year (Level)				
	moA1	moA2	moA3	moB	Total number per category
Total number per school year	18	18	62	19	117
	Gender				
Male	2	1	13	4	20
Female	16	17	49	15	97
	Ethnicity				
Creole	0	4	16	4	24
Hindustani	9	10	21	8	48
Javanese	4	3	4	1	12
Maroon	0	1	7	3	11
Mixed	5	0	13	2	20
	Teaching experience				
Yes	1	4	25	16	46
No	17	14	37	3	71

The demographic characteristics of the participants in this study are given in Table 1. The composition of the study group was 83.1 % females and 16.9 % males.

In all four years we see that the proportion of females pre-service and in-service biology teachers far outnumbered that of males.

The three largest ethnic groups were the Hindustanis (40.7 %), the Creoles (20.3 %) and Mixed (16.7 %).

At the end of the school year 2012 – 2013, the percentage of respondents per school year were as follows: moA1 15.3%, moA2 15.3%, moA3 52.5% and moB 16.1%. Thus, the highest percentage of students for the junior level of the training was in the third school year.
When considering the percentage of pre-service teachers from the research group with or without teaching experience, we see that 39.8 % had teaching experience and 60.2 % had no teaching experience. This was a cumulative percentage taken from both the junior and senior levels of the study group.
The moA1 had the lowest percentage of biology pre-service teachers with teaching experience; this proportion increased in the following years. The moB, as expected, had the highest percentage of pre-service biology teachers with teaching experience.

5.2 BTEBI-B

5.2.1 Reliability

Riggs & Enochs (1990) reported that the STEBI (Science Teaching Efficacy Belief Instrument) is a valid and reliable instrument to measure the science teaching efficacy of pre-service elementary teachers. Reliability analysis of the Personal Science Teaching Efficacy (PSTE) scale produced an alpha coefficient of 0.90 and the Science Teaching Outcome Expectancy (STOE) scale produced an alpha coefficient of 0.76. To measure the reliability (internal consistency) of the BTEBI-B Cornbach's alpha was conducted on both scales of the survey instrument. The BTEBI-B originally consisted of 23 items. After the data collection 7 items, from both the Escale and the Oescale were removed to enhance the reliability of the instrument. The items remaining from the Escale were: 2, 3, 5, 6, 17, 18, 19, 20, 21, 22, and 23. The items remaining from the Oescale were: 1, 11, 14, 15, and 16.
The PBTE (Escale) scale of the BTEBI-B, produced an alpha reliability coefficient of 0.608 and the BTOE (Oescale) scale produced an alpha reliability coefficient of 0.704.

Table 5.2 Means, SDs, and Cronbach's Alpha of Escale and Oescale

	N	Mean	SD	Cronbach's Alpha	N of Items	Original N items
Escale	117	4.0	0.4	0.608	5	7
Oescale	117	3.6	0.6	0.704	11	11

5.2.2 Statistics and data analysis

5.2.2.1 Correlations, means and SDs

A significant correlation (0.051) was found between self-efficacy beliefs and school year but not between outcome expectancy and school year.

Table 5.3 Correlation between school year and efficacy beliefs

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	School year & Self-efficacy beliefs	112	.185	.051
Pair 2	School year & Outcome expectancy beliefs	112	.005	.959

A significant correlation was also found between teaching experience and self-efficacy beliefs but not between teaching experience and outcome expectancy beliefs.

Table 5.4 Correlations between teaching experience and efficacy beliefs

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	teaching experience & Self-efficacy beliefs	112	-.226	.016
Pair 2	Teaching experience & Outcome expectancy beliefs	112	.079	.410

Table 5.5 Means and SDs of Escale per school year

Escale			
Schoolyear	Mean	N	SD
moA1	51.1176	17	4.16657
moA2	49.5882	17	4.40254
moA3	52.3333	60	5.73620
moB	53.5000	18	3.16692
Total	51.9196	112	5.07447

Table 5.6 Means and SDs of Oescale per school year

Oescale			
schoolyear	Mean	N	SD
moA1	34.2778	18	4.92061
moA2	33.8125	16	4.00364
moA3	35.6167	60	4.07178
moB	33.1111	18	4.56185
Total	34.7411	112	4.34492

5.2.2.2 Significance of difference in mean scores between school years

Paired test of the school years showed no significant difference between the self-efficacy scores of the following pairs: moA1 – moA2, moA1 – moA3, moA3 – moB. Paired tests also showed only a minimal significant difference between the self-efficacy scores of moA1 – moB and moA2 – moA3pairs. However there was a significant difference between the self-efficacy scores of the moA2 – moB pair.

Table 5.7 Overview of significant difference between self-efficacy beliefs scores of school years

Significance of difference self-efficacy scores				
	moA1	moA2	moA3	moB
moA1		.306	.419	.065
moA2	.306		.072	0.005
moA3	.419	.072		.413
moB	.065	0.005	.413	

Paired test of the school years showed no significant difference between the outcome expectancy scores of the following pairs: moA1 – moA2, moA1 – moA3, moA1 – moB, moA2 – moA3 and moA2 - moB. Paired tests also showed only a minimal significance in difference between the self-efficacy scores of the moA3 – moB pair.

Table 5.8 Overview of significant difference between outcome expectancy beliefs scores of the school years

Significance of difference outcome expectancy scores				
	moA1	moA2	moA3	moB
moA1		.766	.248	.466
moA2	.766		.118	.639
moA3	.248	.118		.029
moB	.466	.639	.029	

Table 5.9 Escale and Oescale mean scores of biology pre-service teachers with and without teaching experience

Group Statistics						
	teaching experience		N	Mean	SD	Std. Error Mean
Escale2	–	yes	46	4.0860	.37608	.05545
		no	71	3.9280	.40619	.04821
Oescale2	–	yes	46	3.5217	.63313	.09335
		no	71	3.5775	.59190	.07025

Table 5.10 Significance of difference in mean Escale and Oescale scores between pre-service teachers with and without teaching experience

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Escale2	Equal variances assumed	.950	.332	2.114	115	.037	.15793	.07470	.00996	.30590
	Equal variances not assumed			2.149	101.467	.034	.15793	.07347	.01218	.30367
Oescale2	Equal variances assumed	.151	.698	-.484	115	.629	-.05573	.11515	-.28381	.17236
	Equal variances not assumed			-.477	91.526	.635	-.05573	.11683	-.28777	.17632

Table 10 shows a significant difference in the self-efficacy scores between pre-service teachers with and without teaching experience. There is however no significant difference between the outcome expectancy scores of pre-service teachers with and without teaching experience.

5.3 Context beliefs

5.3.1 Reliability

As mentioned earlier for the reliability analysis of the adapted Context beliefs instrument the four categories were brought back to three. The categories “micro- and intermediate and professionalism” were taken as a whole. From the Cronbach’s alpha scores we can conclude that the division of the Context Beliefs items in categories resulted in a high reliability of the adapted instrument! The reliability of the adapted instrument can also be seen in the low scores of the standard deviation.

Table 5.11 Means, SDs and Cronbach’s Alpha of Context Beliefs categories

	Descriptive Statistics			Reliability Statistics			
Categories	N	Mean	SD	Cronbach's Alpha	N of Items	Original N of items	
Macro	47	3.1	0.53	0.760	5	5	
Materials	47	3.5	0.42	0.715	6	6	
Micro, Intermediate, Professionalism	47	3.2	0.42	0.845	12	14	

5.3.2 Statistics and data analysis

5.3.2.1 Correlations

A significant correlation was also found between the context beliefs and teaching experience and between the context beliefs and school year of the in-service teachers.

Table 5.12 Paired samples correlations Context Beliefs

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	teaching experience & Context Beliefs	115	-.965	.000
Pair 2	schoolyear & Context Beliefs	114	.414	.000

Also the Pearson Correlation of pairs between the three categories indicates a significant correlation between the all three categories.

Table 5.13 Correlations between Context Beliefs categories

		Macro	Materials	Micro, Intermediate, Professionalism
Macro	Pearson Correlation	1	0.638	0.796
	Sig, (2-tailed)		0.000	0.000
	N	47	47	47
Materials	Pearson Correlation	0.638	1	0.761
	Sig, (2-tailed)	0.000		0.000
	N	47	47	47
Micro, Intermediate, Professionaism	Pearson Correlation	0.796	0.761	1
	Sig. (2-tailed)	0.000	0.000	
	N	47	47	47

5.3.2.2 Priorities

As mentioned earlier the items from the Context Beliefs instrument were divided into four categories: micro and intermediate, macro, materials, and professionalism. For each category we looked at the highest and lowest mean scores per item. Simply formulated the items with the lowest mean scores would help them the most to enhance their sense of self-efficacy and thus have a higher priority for them. The items with an intermediate mean score could help to enhance their sense of self-efficacy and the items with the highest mean scores would not enhance their sense of self-efficacy.

The total scores of the in-service teachers per item range from 61 to 108 (with two outliers 128 and 146). A scale was made from the total scores by calculating the difference between the lowest (61) and the highest score (108) divided by three. This was done to be able to distinguish between high priority (61– 75), medium priority (76 – 90) and low priority items (91 – up).

Table 5.14 Priorities of the Context Beliefs items for each category

Items per category	Total score per item	Average score per item
Micro and Intermediate		
Adoption of an official school science curriculum (goals, objectives, topics, etc.)	70	0.593
Team planning time with other teachers.	74	0.627
Reduced class size (number of pupils).	78	0.666
Support from administrators.	79	0.675
Teacher input and decision making.	82	0.694
Planning time.	83	0.703
Parental involvement.	93	0.788
An increase in students' academic abilities (*).	96	0.813
Classroom assessment strategies.	101	0.855
Extended class period length (e.g., block scheduling).	108	0.915
A decrease in your course teaching load.	128	1.094
A reduction in the amount of content you are required to teach.	146	1.237
Macro		
State and national guidelines for science education (standards and goals).	77	0.652
Involvement of the state board of education.	77	0.652
Involvement of scientists.	85	0.720
Involvement of university professors.	93	0.788
Community involvement (civic, business, etc.).	101	0.855
Materials		
Permanent science equipment (microscopes, glassware, etc.).	61	0.516
Science curriculum materials (textbooks, lab manuals, activity books, etc.)	65	0.550
Hands-on science kits (activities and equipment).	67	0.567
Technology (computers, software, Internet).	71	0.601
Classroom physical environment (room size, proper furniture, sinks, etc.).	72	0.610
Expendable science supplies (paper, chemicals).	87	0.737
Professionalism		
Professional staff development on teaching (workshops, conferences, etc.).	69	0.584
Support from other teachers (coaching, advice, mentoring, modeling, informal discussions, etc.).	76	0.644
Increased funding.	99	0.838

Table 5.15 Grouping of the Context Beliefs items according to priority

Items which could have or have *the most influence* on efficacy beliefs in teaching biology are	Items which could have or have *medium influence* on efficacy beliefs in teaching biology are	Items which could have or have *the least influence* on efficacy beliefs in teaching biology are
Team planning time with other teachers.	Planning time.	Extended class period length (e.g., block scheduling).
Adoption of an official school [biology] curriculum (lesson goals, objectives, topics, etc.)	Support from administrators.	Parental involvement.
Hands-on [biology] kits (activities and equipment).	Reduced class size (number of pupils).	An increase in students' academic abilities (*).
Permanent [biology] equipment (microscopes, glassware, etc.)	Teacher input and decision making.	A decrease in your course teaching load.
Classroom physical environment (room size, proper furniture, sinks, etc.)	State and national guidelines for [biology] education (standards and goals).	A reduction in the amount of content you are required to teach.
[Biology] curriculum materials (textbooks, lab manuals, activity books, etc.)	Involvement of the state board of education.	Classroom assessment strategies.
Technology (computers, software, Internet).	Involvement of scientists.	Community involvement (civic, business, etc.).
Professional staff development on teaching (workshops, conferences, etc.).	Expendable science supplies (paper, chemicals).	Involvement of university professors.
	Support from other teachers (coaching, advice, mentoring, modeling, informal discussions, etc.).	Increased funding.

5.4 Focus group

The data collected with the adapted efficacy instrument (BTEBI-B) and the adapted Context Beliefs instrument were data from *a certain moment* during the teacher training. Therefore, no conclusions could be derived about the *development* of the efficacy beliefs of the pre-service and in-service teachers. From these data only information with regard to the difference in efficacy beliefs between the four school years of the training could be derived. So in order to get some sense of the development of the efficacy beliefs of the pre-service and in-service teachers of the IOL, a focus group was done with senior biology students who were enrolled at the teacher training institute for the school year 2013 – 2014 and thus had already completed the first three years of their teacher training.

5.4.1 Individual experiences

There were 23 participants of which 20 handed in their individual evaluations of the focus group.

The evaluations were sorted and grouped into three categories of experiences:

- *General* experiences with regard to the development of their self-efficacy beliefs,
- Experiences with regard to the *positive influences* of the teacher training on the development of their self-efficacy beliefs and
- Experiences with regard to the *negative influences* of the teacher training on the development of their self-efficacy beliefs.

5.4.2 Development of self-efficacy beliefs during teacher training

All participants indicated that their self-efficacy beliefs increased more or less during their teacher training. This increase in self-efficacy was expressed in different ways:

- An increase in *professional knowledge*
- An increase in *skills*
- More *insight in teaching*
- An increase in *motivation*
- Being able to *apply their knowledge*
- The *development* of their *confidence and self-image.*

Two participants indicated that teaching was a conscious choice when they enrolled at the teachers' college while two others said that they did not really want to stand in front of a class so teaching wasn't a conscious choice. The rest of the students all indicated that when they started the teacher training they did not have a clue what being a teacher or teaching involved. One of the female students stated that for her the 'real' feeling of self-efficacy came only after she had been teaching for a year. Still another said that after the teacher training she switched professions to become a teacher.

In general all students indicated a degree of increase in their feeling of self-efficacy during their teachers training. But obstacles to the development of their self-efficacy were also mentioned. Below is a listing of both factors which contributed to and factors which were seen as obstacles for the development of the self-efficacy of the focus group participants.

Table 5.16 Obstacles and contributing factors to the development of self-efficacy beliefs

Factors which according to the students *contributed* to the development of their efficacy beliefs	Factors which according to the students were *obstacles* for the development of their efficacy beliefs
The subjects from their vocational training	Low self-confidence
The subject from their didactics training	The language (English) of the handbook they had to study most of their subjects from
Tools to study (study skills)	The classes from certain teachers
Subject content knowledge	Unrealistic expectations of the teaching profession
Supervision and coaching of teachers	The purpose of the auxiliary subjects (physics, chemistry and mathematics) for teaching biology was not clear
Orientation practice	Emphasis of the teacher training is more on the transfer of knowledge instead of practice oriented
Teaching practice	Not enough preparation for the final training stage of teaching practice
Being able to apply their knowledge in practice	Being unable to get a passing grade for certain subjects
Field excursions	Too little variation in testing (evaluation) methods
Competence of the teachers	Too little supervision with the making of lesson plans
Practical assignments	Too little practical practicing in the second year of the teacher training program
	The new methods used by the pedagogy teacher doesn't correspond with methods used by the work placement schools
	Too much subjects in the training curriculum
	Overlapping of subject contents
	Too much difference between the supervision and coaching of the pedagogy teachers and the subject content teachers

The results from the group presentations with regard to the development of the self-efficacy were consistent with the individual evaluations.

6 DISCUSSION

This study was done to assess the efficacy and context beliefs of the pre-service biology teachers of the Advanced Teacher Training Institute with regard to teaching biology. Using three complementary methods (an adapted version of the BTEBI (Savran & Cakıroglu, 2001), an adapted version of the Context beliefs instrument (Lumpe, 2000), and a focus group), the results suggest that the pre-service biology teachers of the Advanced teacher training Institute (IOL) experienced a degree of growth in the development of their sense of efficacy during their training. The result also indicated factors which have a positive influence on the development of their sense of efficacy and factors which are seen as obstacles to the development of their sense of efficacy.

The results of the *self-efficacy scale* of the efficacy instrument suggested that there was little or no significant difference between the mean scores of the school years of the junior level. There was however a significant difference in the mean self-efficacy scores between the second year of the junior level and the senior level. According to Feiman-Nemer et al.(1989) many pre-service teachers enter the teacher training with the belief that teaching is easy. Because of these misguided beliefs, many pre-service teachers enter the program with high confidence in their ability to perform well in the profession (Richards & Killen, 1994). This phenomenon is reflected in the mean self-efficacy scores of especially the junior level of the teacher training. The self-efficacy mean scores are relatively higher in the first year compared to the second year. In the third and senior year the mean scores show a slight increase again.

The results also suggested no significant difference in the *outcome expectancy scores* between the school years of the junior level. As with the self-efficacy scale, the mean scores of the third year of the junior level differed statistically significantly from that of the senior level of the teacher training. Since there was a strong correlation between school year and self-efficacy, a significant difference could be expected in the self-efficacy mean scores between the school years of the junior level and not only between the junior and the senior level. As well, no significant difference in the outcome expectancy mean scores between the junior and senior levels would be expected. The results could be attributed to the fact that the largest proportion of pre-service teachers with teaching experience was found in the third year of the junior level and in the senior level. These participants had an expectancy of the outcome of their teaching because of their teaching experience at a primary school level.

The data also suggests a significant correlation between teaching experience and self-efficacy beliefs but no correlation between teaching experience and outcome expectancy beliefs. The result also indicated a significant difference in the self-efficacy mean scores between the pre-service teachers with and without teaching experience. There was, however, no significant difference in the outcome expectancy mean scores between the pre-service teachers with and without teaching experience. Here too the results coincide with our expectation that teachers with teaching experience have a higher sense of self-efficacy because they already have teaching experience at a primary level. Teachers with teaching experience can also be expected to have a higher sense of outcome expectancy, but as we see from the our results are at variance with this expectation.

However, as mentioned earlier, this data observation was only an indication of the sense of efficacy at a certain moment during the teacher training and did not give us any insight into the factors which enhance or hinder the development of the efficacy during the teacher training. To obtain more insight into the factors, which enhance or hinder the development of self-efficacy according to the students, an adapted version of the Context Beliefs instrument (Lumpe, 2000) was used. The quantitative statistics of the context beliefs instrument suggested a significant correlation between school year and context beliefs, between teaching experience and context beliefs, and between the three categories of the context beliefs instrument. The qualitative result led to the conclusion that the pre-service teachers indicated three categories of items: items which could have or have *the most influence* on efficacy beliefs in teaching biology, items which could have or have *medium influence* on efficacy beliefs in teaching biology and items which could have or have *the least influence* on efficacy beliefs in teaching biology. From the grouping according to priority (most to least influence on efficacy in teaching biology) the conclusion could be draw that the in-service teachers of the research group are mainly focused on education on a micro- and intermediate level. In other words, the daily aspects of education, the aspect they are familiar with and which according to them probably are within their scope of influence. The educational factors which they belief to be out of their immediate influence are deemed of less influence or importance.

The result from the BTEBI-B instrument and the adapted version of the context instrument did not however give us any insight into the development of the self-efficacy in teaching biology during the teacher training. For this reason, a focus group was carried out to gain more qualitative information, albeit in hindsight, about the development of the self-efficacy

of the pre- and in-service teachers. From this information we not only found conformation for a positive development in self-efficacy during the teacher training but also information about the factors which enhanced or hindered this development. Among the important factors mentioned for the enhancement of pre-service teachers self-efficacy one that stands out is the importance of teacher educators use of more practical teaching methods. This also indicates the importance of teacher educators' self-efficacy beliefs in the use of more practice oriented teaching methods.

It is clear that the data collected by each method contributed to the information already gathered by the previous method. The use of a mixed method research produced a richness of information that could not be accomplished through quantitative research alone. For example, the qualitative data of the focus group produced information concerning specific subjects of the teacher training, that contributed a great deal to the enhancement of the students' self-efficacy. Information was also obtained about the factors regarded as obstacles to the students' efficacy development. This information is very important for teacher training institutes in general, and will specifically enable the Biology department of the IOL to formulate specific goals and to work more target-oriented towards the enhancement of the sense of self-efficacy of its pre- and in-service (biology) teachers. These developments may cause a 'ripple effect' throughout the Biology department and hopefully the IOL so that in the future we can be an example for other teacher training and education institutes. The hope is that this ripple effect will also make a growing number of teacher trainers aware of the importance of using efficacy enhancing teaching methods. The data from the focus group also indicated which subjects were chiefly responsible for the enhancement of the students self-efficacy. And this positive influence caused the students to become more motivated, which was one of the factors that enhanced their sense of efficacy and enabled them to successfully complete the first three years of their training.

7 LIMITATIONS

Suriname has relatively small schools and because of this it was difficult to find an in-service biology teachers group large enough to get reliable data. Most high schools in Suriname only have two biology teachers and the colleges only have three or four biology teachers. Sometimes teachers are even shared between colleges. Even the teaching staff of the biology department of the teacher training institute (IOL) only consists of about eighteen to twenty teachers including the teachers of the auxiliary subjects. The only groups large enough for this study were the pre-service and in-service teachers from one of the teacher training institutes in Suriname.

The data collected from the focus group were in hindsight and thus could be considered subjective as opposed to being objective depending on how the students experienced their training period at the institute.

The time allotted for the study did not allow for a longitudinal study of the development of teachers' efficacy during their teacher training.

8 RECOMMENDATIONS

8.1. Recommendations with regard to efficacy beliefs in teaching biology

The follow-up of this study could be seen as the ripple effect of a drop of water in a pond, causing a ripple of ever widening concentric circles through our education system, as visualized by fig. 1.

- The results of this study could therefore help IOL and specifically the biology department to develop ways to aid students to effectively develop their sense of efficacy in order to become successful teachers.
- The first follow-up could be using the data from the research study to develop and pilot a concentric teaching method for the biology department of the teachers' training institute (micro level) which could serve as a model for IOL. This concentric teaching method could be developed according to the same approach as the concentric steps method of Brunia & van Wijgerden (1987) to teach children how to play chess.
- As a follow-up, the results of the pilot could then be implemented on a broader scale of all *the biology pre-service teachers* of all the teacher training institutes (TTI's) of Suriname (meso level). The results of the different teacher training institutes could then be compared with each other. However, we have to take into consideration the difference in level of the teacher training institutes.
- Separate nationwide studies could also be done of the experiences and needs with regard to efficacy and context beliefs *of the in-service biology teachers* of the different levels of the education system in Suriname (macro level).
- The purpose of these concentric studies (micro, meso and macro levels) would be to gain more specific and detailed information about the situation with regard to the efficacy beliefs of pre- and in-service teachers nationwide. There are common problems which all teaching institutes share but there are also specific needs. With this information the teacher training institutes in close collaboration with the ministry Ministry of Education and all the actors in the field of education could develop common and/or specific solutions to suite their purposes.

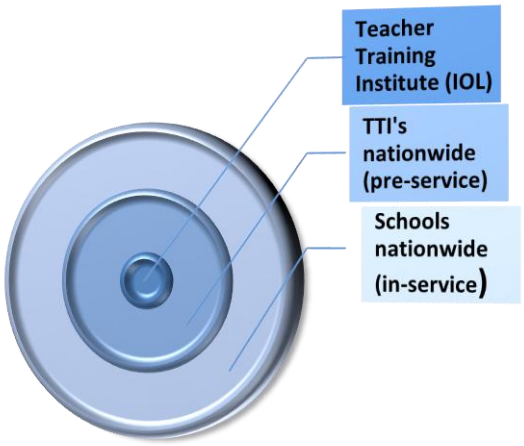

Figure 8.1. Ripple effect of concentric studies.

8.2. Recommendations with regard to context beliefs in teaching biology

The data from the context beliefs instrument revealed three categories of items: items which according to the respondents could have or have *the most influence* on their efficacy beliefs in teaching biology; items which according to the respondents could have or have *medium influence* on their efficacy beliefs in teaching biology; and items which according to the respondents could have or have *the least influence* on their efficacy beliefs in teaching biology.

First of all, the most important needs of the in-service teachers have to be met! Supply them with what they say they need to increase their sense of efficacy. Most of the items mentioned in the '*the most influence'* category are activities that are already being done in most schools or activities that can be accomplished with a minor or even no financial investment.

Secondly, in-service teachers must be given a voice in decision-making on all levels of management and administration. The Ministry of Education cannot make well-founded decisions for improving our educational system if they do not have concrete information about the problems the in-service teachers face on a daily basis. On top of that, each school has its own specific school culture and specific problems. Numerous researchers investigators have already discussed the importance of school culture in school improvement (Goodlad, 1984; Hopkins, 1990; Little, 1982; Purkey & Smith, 1983). So in order for the Ministry of

Education to make well-founded decisions, it would be wise to include representatives of the in-service teachers in the decision process. Therefore, educational projects initiated without first evaluating the actual problems and the needs of the in-service teachers on different educational levels will only be guess work and will have a high risk of not realizing the intended goals.

8.3. Recommendations with regard to the results of the focus group

As mentioned in the result most of the student who participated in the focus group indicated that the subjects from the vocational training and didactics contributed a great deal to the development of their sense of self-efficacy as teachers. Follow-up interviews could be done with some of the students who participated in the focus group and also with students from the different school years who are actually taking these classes. From these interviews specific information could be generated about the aspects of these two subjects that contributed the most to their sense of efficacy. When these factors have been identified the biology department could look for ways to integrated them into the other subjects of the teacher training.

Other factors that were mentioned had to do with the more practical aspects of the teacher training. Together the teachers of the biology department could share their experiences on their use of more practical teaching methods and help each other look for ways to implement them in the curriculum. However, it should be taken into consideration that there needs to be a balance in the teaching methods used throughout the curriculum and that the methods used suit the purpose of the specific subjects. For example, one of the purposes of a teacher training institute is to train pre-service teachers in teaching skills. If the main purpose of a subject is to teach pre-service teachers how to work in groups, then a teaching method with a group setting should be used. If the main purpose of the subject is to gain knowledge, then a more teacher centered teaching method could be used.

Students also have to be made aware of the importance of their participation in and responsibility for their development to become successful teachers. This means taking an active role in the development of their efficacy in teaching biology.

To be able to play an active role in their own development towards becoming a successful teacher, students have to develop their learning skills. IOL as a teacher training institute and the biology department specifically can play an important role in this development by improving their students' learning skills.

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APPENDICES

Appendix 1

Items of the original STEBI(-A) instrument (Enochs & Riggs, 1989)

1. When a student does better than usual in science, it is often because the teacher exerted a little extra effort.
2. I am continually finding better ways to teach science.
3. Even when I try very hard, I do not teach science as well as I do most subjects.
4. When the science grades of students improve, it is often due to their teacher having found a more effective teaching approach.
5. I know the steps necessary to teach science concepts effectively.
6. I am not very effective in monitoring science experiments.
7. If students are underachieving in science, it is most likely due to ineffective science teaching.
8. I generally teach science ineffectively.
9. The inadequacy of a student's science background can be overcome by good teaching.
10. The low science achievement of some students cannot generally be blamed on their teachers.
11. When a low-achieving child progresses in science, it is usually due to extra attention given by the teacher.
12. I understand science concepts well enough to be effective in teaching elementary science.
13. Increased effort in science teaching produces little change in some students' science achievement.
14. The teacher is generally responsible for the achievement of students in science.
15. Students' achievement in science is directly related to their teacher's effectiveness in science teaching.
16. If parents comment that their child is showing more interest in science at school, it is probably due to the performance of the child's teacher.
17. I find it difficult to explain to students why science experiments work.
18. I am typically able to answer students' science questions.
19. I wonder if I have the necessary skills to teach science.

20. Effectiveness in science teaching has little influence on the achievement of students with low motivation.
21. Given a choice, I would not invite the principal to evaluate ay science teaching.
22. When a student has difficulty understanding a science concept, I as usually at a loss as to how to help the student understand it better.
23. When teaching science, I usually welcome student questions.
24. I do not know what to do to turn students onto science.
25. Even teachers with good science teaching abilities cannot help some kids to learn science.

Appendix 2

Items of the Science Teaching Efficacy Instrument- Pre-service (STEBI-B) instrument (Enochs & Riggs, 1990)

1. When a student does better than usual in science, it is often because the teacher exerted a little extra effort.
2. I will continually find better ways to teach science.
3. Even if I try very hard, I will not teach science as well as I will most subjects.
4. When the science grades of students improve, it is often due to their teacher having found a more effective teaching approach.
5. I know the steps necessary to teach science concepts effectively.
6. I will not be very effective in monitoring science experiments.
7. If students are underachieving in science, it is most likely due to ineffective science teaching.
8. I will generally teach science ineffectively.
9. The inadequacy of a student's science background can be overcome by good teaching.
10. The low achievement of some students cannot generally be blamed on their teachers.
11. When a low-achieving child progresses in science, it is usually due to extra attention given by the teacher.
12. I understand science concepts well enough to be effective in teaching science.
13. Increased effort in science teaching produces little change in some students' science achievement.
14. The teacher is generally responsible for the achievement of students in science.
15. Students' achievement in science is directly related to their teacher's effectiveness in science teaching.
16. If parents comment that their child is showing more interest in science at school, it is probably due to the performance of the child's teacher.
17. I will find it difficult to explain to students why science experiments work.
18. I will typically be able to answer students' science questions.
19. I wonder if I will have necessary skills to teach science.
20. Given a choice, I will not invite the principal to evaluate my science teaching.

21. When a student has difficulty understanding a science concept, I will usually be at a loss as to how to help the student understand it better.
22. When teaching science, I will usually welcome student questions.
23. I do not know what to do to turn students on to science.

Appendix 3

Items of the Biology Teaching Efficacy Instrument (BTEBI) (Savran & Çakiroglu, 2001).

1. When a student does better than usual in biology, it is often because the teacher exerted a little extra effort.
2. I will continually find better ways to teach biology.
3. When the biology grades of students improve, it is often due to their teacher having found a more effective teaching approach.
4. I know the steps necessary to teach biology concepts effectively.
5. I will not be very effective in monitoring biology experiments.
6. If students are underachieving in biology, it is most likely due to ineffective biology teaching.
7. I will generally teach biology ineffectively.
8. The inadequacy of a student's biology background can be overcome by good teaching.
9. The low biology achievement of some students cannot generally be blamed on their teachers.
10. When a low-achieving child progresses in biology, it is usually due to extra attention given by the teacher.
11. I understand biology concepts well enough to be effective in teaching biology.
12. Increased effort in biology teaching produces little change in some students' biology achievement.
13. The teacher is generally responsible for the achievement of students in biology.
14. Students' achievement in biology is directly related to their teacher's effectiveness in biology teaching.
15. If parents comment that their child is showing more interest in biology at school, it is probably due to the performance of the child's teacher.
16. I will find it difficult to explain to students why biology experiments work.
17. I will typically be able to answer students' biology questions.
18. I wonder if I will have the necessary skills to teach biology.
19. Given a choice, I will not invite the principal to evaluate my biology teaching.

20. When a student has difficulty understanding a biology concept, I will usually be at a loss as to how to help the student understand it better.
21. When teaching biology, I will usually welcome student questions.
22. I do not know what to do to turn students on to biology.

Appendix 4

Questionnaires instructions (Dutch)

Beste Biologiestudent/Biologiedocent,

Bedankt dat u wilt meedoen aan deze enquete.

Deze vragenlijst maakt deel uit van een onderzoek dat uitgevoerd wordt aan het Instituut voor de Opleiding van Leraren (IOL). Het doel van dit onderzoek is om na te gaan hoe u uw eigen kwaliteiten inschat over het verzorgen van biologieonderwijs. Om een juist beeld te krijgen van het bovenstaande is het dus van essentieel belang dat u uw mening op elke stelling geeft.

Alle informatie die u verstrekt is strikt confidentieel en zal onder geen enkele omstandigheid aan derden worden afgegeven. Uw deelname aan dit onderzoek wordt zeer op prijs gesteld. Uw mening is cruciaal voor ons omdat wij m.b.v. de nieuwe inzichten die voortvloeien uit dit onderzoek kunnen werken aan de kwaliteitsverbetering van het biologie onderwijs op het IOL en het voortgezet onderwijs. Ik zou het daarom zeer op prijs stellen indien u de tijd wil nemen om deze vragenlijst volledig in te vullen.

Voor het invullen van deze vragenlijst heeft u minder dan een half uur nodig.

Appendix 5

Demographic information section of questionnaire (Dutch)

DEMOGRAFISCHE GEGEVENS

Vul onderstaande gegevens volledig in voordat u naar de volgende pagina gaat!

Plaats bij de vragen 2 t/m 5 een kruisje achter uw keus.

Omcirkel bij vraag 6 uw keus en vul bij 7 het aantal jaren dat u al lesgeeft op een VOJ of VOS school in.

1.Naam (Confidentieel)							
2.Geslacht	Mannelijk:				Vrouwelijk:		
3.Etniciteit	Cr.:	Hind:	Jav.:	Chin.:	BCr.:	Ind.:	Gem.:
4.Leeftijd	15-19:	20-24:	25-29:	30-34:	35-39:	40-ouder:	
5.Leerjaar (niveau)	MOA-1:	MOA-2:	MOA-3:	MOB:			
6.Onderwijservaring	Ja/Nee						
7.Indien Ja Hoeveel jaren?	……. Jaren						
Note:	Indien u bij vraag 6 Ja hebt ingevuld dan graag de tweede vragenlijst ook invullen.						

Cr.= Creool; Hind= Hindostaan; Jav.= Javaan; Chin.= Chinees; B.Cr. = Bosland creool; Ind.= Indiaan; Gem.= Gemengd

Appendix 6

The adapted BTEBI-B instrument (Dutch).

VRAGENLIJST I

Formulier voor het bepalen van de Zelf-werkzaamheid van Biologie Leraren in Opleiding van het IOL

Geef de mate aan waarmee u het eens of oneens bent met elk van de onderstaande stellingen door de toepasselijke letters rechts van de stelling te omcirkelen.

HE = Helemaal Eens
E = Eens
OZ = Onzeker
O = Oneens
HO = Helemaal Oneens

1. Wanneer een student beter presteert dan hij/zij normaal presteert voor biologie, komt het meestal doordat de leerkracht een beetje extra inspanning doet.	HE	E	OZ	O	HO
2. Ik zal voortdurend betere manieren vinden om biologie beter te onderwijzen.	HE	E	OZ	O	HO
3. Zelfs als ik heel hard mijn best doe zal ik biologie niet zo goed onderwijzen zoals de meeste andere vakken.	HE	E	OZ	D	HO
4. Wanneer de biologie cijfers van studenten vooruit gaan, is het vaak te danken aan het feit dat hun leerkracht een effectievere aanpak van onderwijzen heeft gevonden.	HE	E	OZ	O	HO
5. Ik ken de stappen die noodzakelijk zijn om biologische begrippen effectief te onderwijzen.	HE	E	OZ	O	HO
6. Ik zal niet erg effectief zijn in het monitoren (toezicht houden op) van biologische experimenten.	HE	E	OZ	O	HO

7. Als studenten onvoldoende presteren in biologie, is het zeer waarschijnlijk te wijten aan de ineffectieve manier waarop biologie onderwezen wordt.	HE	E	OZ	O	HO
8. Over het algemeen zal ik biologie op een ineffectieve manier onderwijzen.	HE	E	OZ	O	HO
9. De tekortkomingen in de biologie achtergrond (kennis) van een student kan worden ingelopen door goed onderwijs.	HE	E	OZ	O	HO
10. De slechte prestaties (of lage cijfers) van leerlingen kunnen over het algemeen niet verweten worden aan hun leerkrachten.	HE	E	OZ	O	HO
11. Wanneer een leerling die minder goed presteert met biologie vooruit gaat, is het gewoonlijk dank zij de extra aandacht die gegeven wordt door de leerkracht.	HE	E	OZ	O	HO
12. Ik heb genoeg verstand van biologische begrippen om biologie effectief te onderwijzen.	HE	E	OZ	O	HO
13. Een toegenomen inspanning bij het onderwijzen van biologie brengt weinig verandering teweeg in de biologie resultaten van sommige leerlingen.	HE	E	OZ	O	HO
14. De leerkracht is over het algemeen verantwoordelijk voor de biologie resultaten (cijfers) van studenten.	HE	E	OZ	O	HO
15. De prestaties van leerlingen bij biologie hangen direct samen met hoe effectief de leerkracht is in het onderwijzen van biologie.	HE	E	OZ	O	HO
16. Als ouders opmerken dat hun kind meer belangstelling toont voor biologie op school, is het waarschijnlijk dankzij de verrichtingen van de biologie leerkracht van de leerling.	HE	E	OZ	O	HO
17. Ik zal het moeilijk vinden om aan leerlingen uit te leggen waarom biologische experimenten werken.	HE	E	OZ	O	HO
18. Het is kenmerkend voor mij dat ik in staat zal zijn de biologie vragen van de studenten te beantwoorden.	HE	E	OZ	O	HO

19.Ik vraag me af als ik de nodige vaardigheden zal hebben om biologie te kunnen onderwijzen.	HE	E	OZ	O	HO
20.Als aan mij de keus wordt geven (als het aan mij ligt) zal ik het schoolhoofd niet uitnodigen om mijn manier van biologie onderwijzen te evalueren.	HE	E	OZ	O	HO
21.Wanneer een leerling problemen heeft met het begrijpen van een biologisch begrip, zal ik gewoonlijk niet weten wat ik moet doen om de leerling te helpen dit begrip beter te begrijpen.	HE	E	OZ	O	HO
22.Wanneer ik biologie zal onderwijzen zal ik het gewoonlijk toejuichen wanneer leerlingen vragen stellen.	HE	E	OZ	O	HO
23.Ik weet niet wat ik moet doen om leerlingen enthousiast te maken voor biologie.	HE	E	OZ	O	HO

Appendix 7

Context Beliefs about Teaching Science (CBATS) instrument (Lumpe et. al, 2000)

Directions: Suppose your goal is to be the most effective science teacher possible during the next school year. Listed below are a number of school environmental support factors that may have an impact on this goal. In the first column, please indicate the degree to which you believe each factor will enable you to be an effective science teacher. In the second column, indicate the likelihood that these factors will occur (or be available to you) during the next school year. Circle the corresponding descriptor that matches your belief.

Environmental Factor	**The following factors would enable me to be an effective teacher. (SA = strongly agree; A = agree; UN = undecided; D = disagree; SD = strongly disagree)**	**How likely is it that these factors will occur in your school? (VL = very likely; SL = somewhat likely; N = neither; SU = somewhat unlikely; VU = very unlikely)**
1. Professional staff development on teaching (workshops, conferences, etc.)	SA A UN S SD	VL SL N SU VU
2. State and national guidelines for science education (standards and goals)	SA A UN S SD	VL SL N SU VU
3. Support from other teachers (coaching, advice, mentoring, modeling, informal discussions, etc.)	SA A UN S SD	VL SL N SU VU
4. Team planning time with other teachers	SA A UN S SD	VL SL N SU VU
5. Hands-on science kits (activities and equipment)	SA A UN S SD	VL SL N SU VU
6. Community involvement (civic, business, etc.)	SA A UN S SD	VL SL N SU VU

7. Increased funding	SA A UN S SD	VL SL N SU VU
8. Extended class period length (e.g., block scheduling)	SA A UN S SD	VL SL N SU VU
9. Planning time	SA A UN S SD	VL SL N SU VU
10. Permanent science equipment (microscopes, glassware, etc.)	SA A UN S SD	VL SL N SU VU
11. Classroom physical environment (room size, proper furniture, sinks, etc.)	SA A UN S SD	VL SL N SU VU
12. Adoption of an official school science curriculum (goals, objectives, topics, etc.)	SA A UN S SD	VL SL N SU VU
13. Expendable science supplies (paper, chemicals)	SA A UN S SD	VL SL N SU VU
14. Support from administrators	SA A UN S SD	VL SL N SU VU
15. Science curriculum materials (textbooks, lab manuals, activity books, etc.)	SA A UN S SD	VL SL N SU VU
16. Technology (computers, software, Internet)	SA A UN S SD	VL SL N SU VU
17. Parental involvement	SA A UN S SD	VL SL N SU VU
18. An increase in students' academic abilities	SA A UN S SD	VL SL N SU VU
19. Involvement of the state board of education	SA A UN S SD	VL SL N SU VU
20. A decrease in your course teaching load	SA A UN S SD	VL SL N SU VU
21. A reduction in the amount of content you are required to teach	SA A UN S SD	VL SL N SU VU
22. Reduced class size (number of pupils)	SA A UN S SD	VL SL N SU VU
23. Involvement of scientists	SA A UN S SD	VL SL N SU VU
24. Involvement of university professors	SA A UN S SD	VL SL N SU VU
25. Classroom assessment strategies	SA A UN S SD	VL SL N SU VU
26. Teacher input and decision making	SA A UN S SD	VL SL N SU VU

Appendix 8

The adapted Context Beliefs Instrument about Teaching Biology (CBATB) (Dutch).

VRAGENLIJST II

Meningen/veronderstellingen over het onderwijzen van [biologie]
(Afgeleid van: Lumpe, 2000 "Beliefs about teaching science")

Richtlijnen:

Stel je voor dat je doel is de meest effectieve biologie leerkracht mogelijk te worden gedurende het volgend schooljaar. In de eerste kolom van de vragenlijst hieronder is een lijst van school milieu ondersteunende factoren die invloed kunnen hebben op uw doel. Geef in de tweede kolom aan, in welke mate elke factor u in staat zal stellen een effectieve(re) [biologie] leerkracht te zijn. Omcirkel de corresponderende descriptor die overeenkomt met uw mening.

De volgende milieu factoren zouden mij in staat kunnen stellen om een effectieve(re) biologie leerkracht te worden.	**(HE = Helemaal eens; E = Eens; GM = Geen mening/Onzeker; O = Oneens)**			
1. Professionalisering van personeel in het onderwijzen d.m.v. workshops, conferencies, enz.	HE	E	GM	O
2. Nationale richtlijnen voor biologie onderwijs. (standaarden en doelen).	HE	E	GM	O
3. Ondersteuning van andere leerkrachten (coaching, advies, mentoren, modeleren, informele discussies, enz.).	HE	E	GM	O
4. Tijd voor planning in team verband met andere leerkrachten.	HE	E	GM	O
5. Practische biologie pakketen (activiteiten en benodigdheden).	HE	E	GM	O

6. Betrokkenheid van de gemeenschap (burgers, bedrijven, enz.).	HE	E	GM	O
7. Meer fondsenwerving.	HE	E	GM	O
8. Meer lesuren (bijv. blokuren inroosteren).	HE	E	GM	O
9. Voorbereidingstijd.	HE	E	GM	O
10. Aanwezigheid van permanente biologie benodigheden (microscopen, glaswerk, enz.).	HE	E	GM	O
11. Fysieke eigenschappen van het lokaal (grootte, gepaste meubilair, wasbakken, enz.).	HE	E	GM	O
12. Toepassing van een officieel school biologie curriculum (lesdoelen, einddoelen, thema's, enz.).	HE	E	GM	O
13. Wegwerp/verbruikbare biologie voorraden (papier, chemicalien).	HE	E	GM	O
14. Ondersteuning van schoolleiders.	HE	E	GM	O
15. Biologie curriculum materialen (handboeken, practicum handleidingen, activiteiten boeken, enz.).	HE	E	GM	O
16. Technologie(computers, software, Internet).	HE	E	GM	O
17. Betrokkenheid van de ouders.	HE	E	GM	O
18. Een toename van de schoolse/academische bekwaamheden van de leerlingen.	HE	E	GM	O
19. Betrokkenheid van het ministerie van onderwijs.	HE	E	GM	O
20. Een afname van uw lesuren belasting.	HE	E	GM	O
21. Een vermindering van de vakinhoud die u moet onderwijzen.	HE	E	GM	O
22. Kleinere klassen (aantal leerlingen).	HE	E	GM	O
23. Betrokkenheid van wetenschappers.	HE	E	GM	O
24. Betrokkenheid van universiteit docenten.	HE	E	GM	O
25. Klaslokaal beoordelings strategien.	HE	E	GM	O
26. Input/inbreng van de leerkracht en besluitvorming.	HE	E	GM	O

Appendix 9

The results of the focus group (Dutch)

Focuspunt:

U hebt drie leerjaren (moA 1 t/m 3) van de opleiding biologie met succes afgerond! "*Geef per niveau aan hoe uw geloof in uw vermogen om bepaalde doelen te bereiken (geloof in uw vaardigheid om biologie te onderwijzen) d.m.v. het organiseren en uitvoeren van de nodige stappen zich heeft ontwikkeld?"* Gebruik hierbij als leidraad de focuspunten genoemd onder "Focuspunten Escale en OEscale".

Individuele meningen m.b.t. verloop efficacy:

Student nummer	Individuele meningen m.b.t. efficacy verloop
I.1	moA1: Begin niet zeker van of ik het wel aan zou kunnen. Mijn zelfvertrouwen nam af omdat ik na 13 jaren weer vakken als Natuurkunde, Wiskunde kregen. Ik was behoorlijk zwak in deze vakken. moA2: Ik was gemotiveerd, mijn zelfvertrouwen nam toe. Ik wist dat mijn keuze niet slecht was. Enkele docenten gaven ook tools mee hoe je kon studeren. moA3: had ik belief in mezelf dat ik de opleiding binnen de 3 jaren zou kunnen afronden omdat ik geen hertentamen te doen had. Als ik nu les geef ben ik mezelf en weet ik waarover ik het heb. Ik kan nu mijn woorden beter kiezen. Bekijk en benader zaken ook anders.
I.2	moA1: helemaal geen inzicht gevormd omtrent het onderwijzen. Ik hield van leren dus vond ik Biologie interessant. Als gevolg hiervan ging ik gewoon door met de opleiding en dacht "nou is niet erg ik wordt gewoon wat in de maatschappij." moA2: hier begon mijn interesse in het onderwijzen toe te nemen. Er werden colleges verzorgd met verschillende technieken (werkvormen) z.a. discussie , groepsopdracht maar ook onderwijsleergesprek. Zo begon ik inzicht te verkrijgen in het lesgeven. Het was voor mij nu als " Hey ik kan ook zo lesgeven". Wat ook nog stimulerend was tot mijn interresse was de colleges van juf Blackman [Vakdidactiek]. Heel aantrekkelijk en het geeft je gewoon push + inzicht in het lesgeven van biologie op verschillende manieren. ** Ik dacht altijd dat Biologie een saai vak was voor anderen, maar zij ontwikkelde het inzicht in mij

	dat ook al is het saai jij als bioleraar kan het interressant maken door verschillende leermethodes toe te passen. moA3: Toen ik hier aankwam kreeg ik les van juf ramdas en zij gaf mij inzicht hoe je je leerlingen kunt stimuleren om voor je vak te studeren. Zo heb ik mijn interresse + inzicht in het lesgeven ontwikkeld. *Toen ik hier op de opleiding kwam (2005) was ik nihil op het gebied van onderwijzen. *Verdiepingsstage heeft geleid dat ik van beroep ben geswitched (medische analist naar leraar)
I.3	moA1: begin zeer zenuwachtig, weinig spraakzaam, slecht in presenteren (voor de klas/groep staan). Na me eerste jaar: Stellen van prioriteiten, gestructureerd en georganiseerd werken, persoonlijke ontwikkeling; hoe moet ik als leerkracht zijn (B.V.), wat zijn mijn zwakke punten, wat kan ik doen om verbetering erin te brengen, een beeld verkregen hoe het lesgeven is (orientatiestage). moA2: Door vakinhoudelijke kennis, B.V. ,Vakdidactiek meer zelfvertrouwen opgebouwd. Leren werken in groepen. Opmaak van een les geleerd. moA3: Zelf in het veld geweest, ervaren hoe het is om voor de klas te staan, theoretische kennis omgezet in praktijk.
I.4	In moA1 had ik nauwelijks het geloof in mezelf dat ik Biologie les zou kunnen verzorgen. In moA2 was het geloof sterker en kreeg ik meer zekerheid. Dit door de kennis die ik opdeed en de leiding en begeleiding van de docenten. In moA3 was het zelfvertrouwen zodanig ontwikkeld dat ik geen enkel twijfel meer had over mezelf. De leerrijke colleges hebben gezorgd voor kennis uitbreiding. De vakken Beroepsvorming en Vakdidactiek hebben mij gevormd in het beroep van biologie docent en de praktijkgerichte opdrachten hebben vaardigheid ontwikkeld.
II.1.	moA1: ik vind dat aan de hand van alles wat ik geleerd had in moA1 al een beetje goed genoeg vond om als leerkracht te functioneren op de MULO school. moA2: hier vond ik dat lesgeven minder aan de orde kwam. Maar van alles wat ik geleerd had kon ik toepassen in mijn vriendenkringen wanneer ze wat wilden weten over biologie. moA3: Was mijn verdiepingsstage gegaan net als hoe ik het verwacht had. Ik vond dat wat geleerd hadden heb kunnen toepassen.
II.2	moA1: ik wist niet hoe een klas tot rust te brengen tijdens de oriëntatiestage. moA2: kennis omtrent biobegrippen werd groter. moA3: Verschillende leuke manieren bedenken om les te geven om de stage af te ronden. Lesgeven vindt ik leuk maar ben onzeker of ik wel een goede docent zal zijn.

II.3	moA1: De opleiding afronden en functioneren als een bioloog is niet als een biologie leerkracht. moA2: mezelf specialiseren binnen een bepaalde Biologie vakgebied moA3: Eigenlijk kiezen voor beide richtingen zowel functioneren als bioloog als Biologie leerkracht.
II.4	moA1: tijdens de orientatie stage van deze periode, kon ik mezelf wel als leerkracht voor de klas zien. Hetgeen wat tijdens de B.V. lessen werd uitgelegd kon ik toepassen tijdens de stage, alhoewel ik nog geen les gaf, maar het zou me lukken. moA2: Krijg je meer B.V. en V.D. vakken, je krijgt meer zelfvertrouwen want in het eerste jaar was dat iets minder dus tijdens het tweede jaar had ik een sterkere zelfvertrouwen dat ik het echt kon doen en voor de klas kan staan met de bagage die ik alvast had gehad. moA3: Was het voor de klas staan. De dingen die je hebt geleerd pas je toe. Tijdens de verdiepingsstage heb ik zelf een plan die ik tijdens het vak V.D. had opgesteld uitgevoerd op de stageschool. En het kwam goed uit. Dus ik heb hetgeen wat ik geleerd had, toegepast en goed ook tijdens de stage.
II.5	moA1: Toen zag ik mijzelf niet voor de klas staan. Zeker na de oriëntage stage ook niet. Had wel meer informatie over scholen maar zag mezelf geen les geven. moA2: Ik zag mijzelf nog steeds niet voor de klas staan. moA3: Na mijn stage zag ik mezelf wel voor de klas staan. Nu had ik wel zelfvertrouwen. Tijdens de opleiding wordt er veel theorie gegeven (biologie), ook de theorie over vakdidactiek word voldoende gegeven. Maar oefening in de praktijk is (vooral in het 2e jaar) minimaal.
III.1	moA1: Hier heb ik veel kennis opgedaan. Beroepsvorming heeft mij geleerd wie ik ben en hoe je met anderen kan omgaan. moA2: Vakdidactiek vindt ik goed omdat ik het overal kan toepassen niet alleen op school. Excursie vindt ik goed. Er moet veel meer practicum worden gedaan moA3: Meer instructies over stage. Bij stage heb ik pas een beeld gekregen hoe het is om les te geven. Veel meer begeleiding voor het maken van lesvoorbereidingen.
III.2	Ik had heel veel nodig aan ondersteuning van collega's en leerkrachten. Heel veel zelfstudie nodig. Door mijn beroep kon ik de opleiding moeilijk combineren. Ik was vaker afwezig. Vakdidactiek heeft mijn prestaties op elk gebied (lichamelijk, geestelijk, emotioneel, sociaal) verbeterd. Ik kon mij beter inleven in die vakken. Ik durfde meer te doen en ik studeerde optijd. Ik heb lesgegeven en het heeft mij gelukt. Veel kennis opgedaan op biologisch gebied.
III.3	Ik heb langer dan drie jaren over de opleiding IOL biologie gedaan. De eerste drie jaren

	gingen heel vlot, ik heb haast alle vakken kunne behalen totdat ik op een bepaald moment niet verder kon. Ik had geen enkele mogelijkheid om verder te gaan. De docent die mij dat moeilijk maakte was zowel op de dag- als avondopleiding ingezet. Ik heb me voor 100% ingezet maar het lukte op geen enkele manier. Mijn hoogste cijfer bij haar was 5.4 en ik had genoeg van die ellende die ik moest doorstaan om ondanks alle inzet, moeite en slapeloze nachten en verlof die ik had opgenomen toch geen voldoende te halen. Ik nam weer actief deel aan de colleges toen ik merkte dat er een andere docent beschikbaar was en binnen 2 jaren had ik de opleiding af. Goed niveau van de opleiding qua kennisoverdracht, de docenten waren vlot en vakbekwaam. Toetsingsmethode is altijd een schriftelijk tentame (ik vindt dat het wel anders kan). Geen transparantie/duidelijk (up to date) informatie, screening van de docenten, mogelijkheid voor of dag- of avondopleiding zodat je keuze hebt. Knelpunten en klachten werden niet zo accuraat behandeld en opgelost. Ik ben wel een volwaardige moA leerkracht vooral tijdens mijn stage met mevr. Blackman als begeleider. Ik heb geleerd om te leren, excursies op niveau, zelfvertrouwen.
III.4	moA1: Verbaasd over de vakken die erbij hoorden zoals wisk., scheik., kansrek. Voorheen waren geen open dagen van het IOL. Vermoeiend: veel vakken; inleiding vakken + hoofdvakken. Verlichtend: de B.V. vakken schenen licht op de wijze van opvoeding. Dit kon ik ook doorvoeren in mijn gezin. Vooral het doorvragen heeft veel kennis over het voortzetten van gesprekken bij mij teweeg gebracht. Orientatie stage heeft mij wat beeld gegeven over te verwachten beelden v/h onderwijs op school. moA2: het jaar van uitdieping van de B.V. Zelfonderzoek over je besteding van de tijd van hoe de jongeren/jeugd zich ontwikkeld. Betere kennis van werking van het lichaam. Het "AH" moment van de opleiding, waarbij je meer respect hebt over de werking van het lichaam. moA3: Hectisch jaar voor IP en BV. Frustratie: het niet kunnen halen van sommige vakken genetica en Dierfysiologie. Doel: afronding. Echter niet gehaald Gen + Dier. De stage: je wordt niet genoeg voorbereid o/d stage. In de stage worden andere werkwijzen van je verwacht dan je ziet i/d praktijk. Mn pedagoog zei dat je de nieuwe methode moet gebruiken, hetgeen niet gebruikt wordt op school. Knelpunt: teleurstellend; 1 docent beheerste Gen + Dierf. En er werd niets aan gedaan. Voorbereiding van de stage (maken van lesvoorbereidingen) laat te wensen over.
III.5	Zelfwaarde: over je zelfbeeld/vaardigheid moA bijdrage aan mijn ontwikkeling. Vakdidactiek: leermiddelen ontwerpen, leerdoeln, spreekvaardigheid, presentatie technieken. Veldbezoeken: kennis over het lichaam, kennis over dieren, kennis over

	planten en bomen. Meer zelfvertrouwen bij presentatie al of niet voor grote groepen. Creatief denken, optijd studeren, zelfstudie, beroepsvorming doorvragen, orientatiestage, tijdsplanning.
IV.1	From nonconfident to confident moA1: tijdens de periode moA zag ik mezelf nog lang niet als een leerkracht. Het was meer een opleiding in biologie, wiskunde, natuurkunde en scheikunde. Ook de lessen BV waren naar mij mening meer een onderwerp en dan portfolio maken. moA2: bij VD kwam het beter tot uiting en kon ik mezelf wel als leerkracht zien maar wist nog niet als ik er goed in zou zijn. Vakinhouden kwamen met elkaar overeen en er ging meer tijd zitten in leerstof dan in skills aanleren. De opleiding leek meer een opleiding om kennis op te doen dan op een opleiding waar je juist kennis moet overdragen (wanneer je de opleiding hebt doorlopen). moA3: om in de stage te komen was een spang-ede want het werd weer duidelijk dat bij deze opleiding gaat het om vakken te halen ipv leraren opleiden. Tijdens de verdiepingsstage toen kon ik mezelf toetsen . Vanuit de opleiding vond ik de begeleiding van vakdocenten en pedagogen hemelsbreed van elkaar. De pedagogen waren er echt om ons te leiden in het leraar zijn.
IV.2	Toen ik mij inschreef op de opleiding voor leraren wist ik al dat ik opgeleid zou worden tot een leerkracht die biologie zou moeten kunnen verzorgen. moA 1-3 hebben mij vakinhoudelijk zoveel als mogelijk bijgebracht dat ik zou nodig hebben op VOJ niveau. Vakdidactiek leek altijd zo enerverend maar blijkt nu ook uiteindelijk een heel belangrijke rol te spelen in het overbrengen van de leerstof. De verschillende onderdelen van beroepsvorming trachten bij te dragen aan het omgaan met de verschillende type studenten. Alleen was ik een groot deel al vergeten toen ik voor de klas stond. De echte self-efficacy kreeg ik pas toen ik de stage in ging en daarna een jaar lesgegeven had.
IV.3	De vaardigheden die nodig zijn om Biologie les te geven heb ik door de opleiding verkregen. Aan het begin geen zicht op hoe om te gaan met leerlingen van VOJ niveau. Vaardigheden om les te kunnen geven waren al aanwezig. Bij bepaalde vakken zag ik het doel van de opleiding niet (kansrekening, natuurkunde). Nu is duidelijk waarom deze vakken verzorgd worden. Het onderwijzen van het vak Biologie is voor mij leuk geworden waarbij ik op een interressante, leuke manier een les kan geven. Het gebruik van de biologische begrippen in het engels was een barriere.De vakken van de opleiding zijn belastend voor studenten. Vroegere LO + moA is ingekort in 3 jaren. Het vak time

	management zal een goede bijdrage leveren aan de aanstaande leerkrachten.
IV.4	moA Biologie oftewel doceren is een bewuste keuze geweest, dat ertoe heeft bijgedragen dat ik de opleiding niet alzodanig moeilijk of problematisch heb gevonden. moA1: de taal, engels een barriere tot het optimaal volgen van de hoofdvakken, hetgeen voor een moment wel had gezorgd voor bezorgdheid. Na de eerste tentamens dacht ik tot waartoe?? Dus wennen aan de taal was nodig! moA2: vakdidactiek heeft voor een groot deel bijgedragen tot de ontwikkeling van kwalitatief leerkracht. Het doceren is niet meer alleen op wat je als kennen hebt gekregen, maar des te meer practisch! moA3: Droom komt uit! Stage heb ik prachtig ervaren! Geen externe factoren.
IV.5	moA1: leerkracht worden was een bewuste keuze. Tijdens moA1 was ik gemotiveerd tot mijn iste stage (orientatie). Toen schrok ik even van wat me te wachten stond als leerkracht en begon ik een beetje te twijfelen als ik het aan zou kunnen om MULO leerlingen les te geven. Als ik keek naar hun gedrag op de bewuste school waar ik meeliep (de Koenderschool). Verder was studeren in het engels ook een struikelblok. moA2: hier vervaagde mijn angst door steeds meer vakkennis en vaardigheden om les te geven. Na mijn verdiepingsstage voelde ik mij al helemaal ready voor het onderwijs op het gebied van vaardigheden maar wilde meer vakkennis. moA3: tijdens moA3 voelde ik mij steeds meer richting volwaardige leerkracht opgaan. In deze fase heb ik veel bemoedigende woorden van docenten gehad v/d opleiding die ook een bijdrage geleverd hebben aan het behalen van het diploma. Mijn struikelblok waren de lessen van een bepaalde docent en had een vrees dat ik ze nooit zou halen. Maar op een gegeven moment toen een andere docent zei dat je geen volwaardige docent kan worden als je niet alle vakken heb gehaald. Toen ik er met alle honderd procent tegenaan en het is gelukt mijn moA diploma's…
V.1	moA1: ik vond het een hele aantrekkelijke opleiding, gezien het feit dat je perse in het onderwijs hoefde. En de manier hoe we benaderd zijn geworden bij de inschrijving. Bij de openingscollege is aan ons medegedeeld dat na het afronden van het moa we een BA titel zouden krijgen. dit was voor mij rede genoeg om vor de studie te gaan. ik wilde niet echt voor de klas staan. De vakken waren te volgen, het is dus vrij goed gegaan het eerste jaar. de motivatie was er. moA2: het tweede leerjaar is een heel frustrerende collegejaar voor mij persoonlijk geweest. het feit dat je een tentamen 2 tot 3 keer maakt en het toch niet haalt is erg stressend. en dat heeft mij erg gedemotiveerd. ik wilde zelf de opleiding verlaten. je had ook nog vele overlappingen van vakken menskunde, genetica en dierfysiologie. moA3: ik heb me zelf de moed ingeproken om de opleiding af te ronden. vooral toen ik

	eenmaal door had hoe bepaalde tentames in elkaar zaten. de vakken genetica en dierfysio met name. toen ik het einde zag was ik echt weer gemotiveerd en zo heb ik dan mijn uiterste best gedaan om de opleiding af te ronden. jammer genoeg is het niet gelukt om het precies binnen die 3 jr af te ronden, maar het feit dat ik me hebt doorgezet vond ik geweldig.

The evaluations were sorted and grouped into three categories of experiences:
Experiences with regard to the development of their self-efficacy beliefs,
Experiences with regard to the *positive influences* of the teacher training on the development of their self-efficacy beliefs and
Experiences with regard to the *negative influences* of the teacher training on the development of their self-efficacy beliefs.

Groeps meningen m.b.t. verloop efficay

Mini focusgroepen	Leerjaren moA		
	moA1	**moA2**	**moA3**
I.In-servicers	-Geen idee wat je te wachten staat -Weinig of geen zelfvertrouwen	-Zelfvertrouwen nam toe -Het vakinhoudelijke heeft bijgedragen tot kennisuitbreiding -Begin van vertrouwen om te kunnen onderwijzen	-Versterking van het vertrouwen in het lesgeven (verdiepingsstage en de pedagogische vakken) -Ontwikkeling van practische vaardigheden
II.Pre-servology	-Het grootste deel van de groep zag zich niet voor de klas staan -1 persoon zag zichzelf wel voor de klas staan na de oriëntatiestage	-We kregen veel theorie. -Hiernaast ook V. D. & B. V., maar 4 van de 5 zag zich toch nog niet voor de klas staan.	-Alle 5 zagen na de stage zichzelf wel voor de klas staan omdat we nu eindelijk theorie in de praktijk konden toepassen.
III.Powisie	-Niveau van de opleiding is goed. -Vakdidactiek en beroepsvorming hebben geleid tot zelfvertrouwen en zelfbeeld ontwikkeling. -Slechte communicatie tussen studenten en docenten. -Toetsingsmethoden kan aangepast worden. -Begeleiding bij het maken van lesvoorbereidingen kan beter.		
IV.Confident	Prioriteitenlijst: 1.De echte bewustwording begon pas bij het vak vakdidactiek (moA2) 2.De taal (engels) als barriere voor het optimaal volgen/begrijpen van de leerstof (moA1) 3.Tijdens de verdiepingsstage zagen wij het nut van het vak beroepsvorming (moA3)		
V.Biofocus	-Deze opleiding is positief begonnen; veel theorie en voldoende praktische opdrachten	-Veel overlappingen. -Geen controle op docenten. -Veel frustraties ontwikkelen zich onder de studenten (begin demotivatie). -Niveau nam toe en dat was positief. -De excursies waren goed.	-Competenties namen toe. -Motivaties namen toe. -Afronding was goed te noemen