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A framework for project-based learning in Consumer Studies teacher preparation

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Abstract

Consumer Studies is a South African high school subject selected by a growing number of learners, requiring that more teachers need to be trained to facilitate the subject in schools. Teacher preparation is based on a Consumer Sciences degree, followed by a one-year Post-Graduate Certificate of Education (PGCE). Student-teachers have to be prepared with the pedagogical and subject knowledge required for teaching a complex subject, as well as the skills required of teachers for the challenges and needs of a changing society, within the limited time available. A suitable teaching/learning strategy that actively involves students in their learning needs to be utilised to achieve this extensive goal. As part of a qualitative case study, the Consumer Studies teacher preparation module at one South African university was therefore restructured to utilise project-based learning as primary teaching/learning strategy. The structuring and implementation of project-based learning in the module was refined over a four-year period. Subsequently, a framework for the planning and preferred structuring of project-based learning in the preparation of Consumer Studies student-teachers was developed. The framework provides uncomplicated, scaffolded guidance for planning and implementing project-based learning. It can be used in teacher preparation modules, as well as in Consumer Studies classrooms.

KEYWORDS: CONSUMER STUDIES, PEDAGOGY, PROJECT-BASED LEARNING, TEACHER PREPARATION

Background

Consumer Studies is an elective subject offered in the final three years of the South African high school curriculum. Although Consumer Studies share some content with international subjects such as Home Economics, the focus in Consumer Studies is on helping learners to develop into responsible consumers and entrepreneurs, who are able to make informed decisions both inside and outside the home (Umalusi, 2014). The number of learners selecting the subject has been increasing since its introduction in 2011 (Department of Basic Education [DBE], 2015), requiring that more teachers need to be prepared as subject specialists in Consumer Studies.

Teaching Consumer Studies is challenging, as it covers an expansive selection of knowledge content in considerable depth (Umalusi, 2014) and teachers have to keep up-to-date and include the latest changes in content, such as when South African consumer laws are amended (DBE, 2011). The content knowledge is offered in combination with one of five practical skills development options, specifically Food Production, Clothing Production, Soft Furnishings Production, Knitting and Crocheting, and Patchwork quilting by hand (DBE, 2011). Consumer Studies student-teachers therefore need to be

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prepared to teach subject-specific content knowledge as well as have practical expertise of all five practical options available at various schools. In addition, student-teachers need to be informed regarding subject-suitable pedagogy (Du Toit, 2014b) and be able to function effectively in a fast-changing world, especially considering transformations in technology and societal structure (Hodelin, 2008). The same trends influencing social change in the United States of America noted by Baugher et al. (2000), and referenced by Nickols and Collier (2015), are noticeable in South Africa. These trends include the acquiring and appropriate use of technology, changes in patterns of work, profound changes in family structure, as well as increased diversity in population composition and culture, and are only some of the challenges that teachers in the field of Consumer Studies will face in a modern world (Janhonen-Abuquah, Posti-Ahokas, Palojoki, & Lehtomäki, 2014; Nickols & Collier, 2015). Consumer Studies student-teachers need to be prepared with skills, such as lifelong self-directed learning, communication, collaboration, problem-solving, critical thinking and planning skills, which will help them to deal with these changes.

Consumer Studies teacher preparation in the PGCE

In South Africa, Consumer Studies teacher preparation is typically structured in the form of a Consumer Sciences or similar bachelor's degree, followed by a Post-Graduate Certificate of Education (PGCE). The structuring of such teacher preparation is based on the expectation that subject content knowledge and practical skills are developed during students' undergraduate studies and that the PGCE focuses on providing pedagogical guidance for the teaching of Consumer Studies as a subject in the South African high school curriculum. The PGCE qualification for Consumer Studies teachers includes only a single semester module, including about eleven weeks of teaching time, that exclusively focuses on Consumer Studies, necessitating that this limited time be optimally utilised to develop subject-suitable pedagogy that include skills in preparation for the challenges they would face when teaching Consumer Studies in the 21st century. According to Smith and De Zwart (2016), the goals of teacher preparation include the developing and expanding of knowledge and skills, as well as instructional and pedagogical strategies.

Guidance available for the preferred pedagogy to be used in South African Consumer Studies teacher preparation is inadequate (Du Toit, 2014b; Du Toit & Booyse, 2015) and is still being developed. Principles underpinning Consumer Studies education, preferred teaching/learning strategies utilised in Consumer Studies education, as well as the 21st century skills which teachers need to function optimally in this age, identified in one of the few studies of its kind in South Africa (Du Toit, 2014a), were used to develop the outcomes of the teacher preparation module at the centre of this investigation. The underpinning principles for Consumer Studies education in South Africa is informed by the subject's core concepts of *the consumer* and *entrepreneurship through small scale product development* (Du Toit, 2014b; Umalusi, 2014), as well as the principles of *encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths* and developing "high knowledge and high skills [sic]", as stated in the South African National Curriculum Statements (DBE, 2011). The shift toward active and critical, problem-centred learning rather than lecture-based learning is a global occurrence (Roessingh & Chambers, 2011). In addition, Consumer Studies education should be learner-centred, life-relevant and transferable to novel contexts (Du Toit, 2014a), which is also true for the preparation of teachers in the subject.

The 21st century skills that were determined to be required of Consumer Studies teachers, and that have to be explicitly developed as part of their teacher preparation module include problem-solving, planning skills, time-management, collaboration, critical thinking skills and assessment skills (Du Toit, 2014a). These 21st century skills, together with the principles underpinning Consumer Studies education and the preferred teaching/learning strategies associated with the subject, were used to develop the outcomes for the Consumer Studies teacher preparation module at the university where the study was conducted. A suitable teaching/learning strategy that could support and foster the module outcomes had to be selected and implemented for the Consumer Studies teacher preparation module.

Project-based learning has been utilised successfully as preferred teaching/learning strategy in preparation modules for teachers in other school subjects, such as Geography (Golightly & Guglielmino, 2015), Mathematics, and Science (Marshall, Petrosino, & Martin, 2010), however, research on the utilisation of PBL in the preparation of Consumer Studies teachers is scarce. Smith and De Zwart (2016) noted that students would benefit from having scaffolds to guide them in the learning process. The implementation of the PBL teaching/learning strategy therefore had to be

carefully planned and scaffolded to ensure that the outcomes set for the preparation of these Consumer Studies pre-service teachers were met.

Project-based learning

Project-based learning (PBL) is “an innovative approach to learning that teaches a multitude of strategies critical for success in the twenty-first century” (Bell, 2010, p.29) in which learning content is intentionally combined with particular skills and values as part of a planned and scaffolded process to solve a life-relevant problem (Du Toit, Havenga, & Van der Walt, 2016; Habók & Nagy, 2016). The problem is used as a starting point around which the teaching and learning of knowledge and skills development is planned and constructed. Students usually present their findings, including the process and solution(s) to the problem, as well as a product (a physical item or plan as part of the solution) to a selected audience consisting of peers or members of a target group. Although project-based learning shares similar elements with problem-based learning, and both are referred to using the acronym PBL, the distinguishing feature of project-based learning is the construction of a product at the culmination of the project (Helle, Tynjälä, & Olkinuora, 2006).

In PBL the students fulfil an active and participatory role in their own learning process, and the lecturer facilitates and guides this learning process, rather than being the *giver of knowledge* (Bell, 2010). Lecturers (or teachers) fulfil the roles of facilitator and mentor in PBL (Guglielmino, 2008) to support the development of students’ thinking skills and provide scaffolding for students’ metacognitive processes (Hmelo-Silver, 2004). Facilitators also act as motivators to foster the learning process in PBL (Habók & Nagy, 2016). Students play a prominent role in their own learning in PBL, becoming *creators of knowledge*, as part of a self-directed learning process, which is guided by the facilitator (lecturer) (Guglielmino, 2008).

Utilising PBL as main teaching/learning strategy holds several advantages for students, including that real-life problems (that are sometimes related to global issues) are addressed (Bell, 2010; Swafford & Dainty, 2010), students learn to value the opinions of others through collaborative work (Mitchell, Foulger, Wetzell, & Rathkey, 2009), and important 21st century skills are developed, such as communication skills, planning skills, higher-order thinking, critical thinking and lifelong learning (Bell, 2010; Buck Institute for Education, 2012; Roessingh & Chambers, 2011). Project-based learning has been found to increase learner motivation, including that of differently-abled learners (Habók & Nagy, 2016). Bradley-Levine et al. (2010) additionally found that students in classes that used PBL were better at transferring knowledge and applying it to different situations, than students who were not in classes using PBL.

Despite these advantages, literature indicates that there are also some challenges related to PBL, which can be avoided if PBL is planned and scaffolded appropriately. These challenges include that facilitators need training to enable them to facilitate PBL effectively (David, 2008), that facilitators and learners need to adjust to the different teaching approach and manner of assessment associated with PBL (Barron et al., 1998) and that learners might need additional guidance in the development of skills like critical thinking (Mergendoller, Markham, Ravitz, & Larmer, 2006), which facilitators have to take into account when planning PBL.

Project-based learning should therefore be structured or scaffolded to gain the most benefits from the strategy, while also aiming to address or avoid the challenges that others have experienced with it.

Research aim, questions and purpose

The aim of this research was to investigate how project-based learning can be structured and implemented to contribute positively to the development of Consumer Studies pre-service teacher preparation. The following two questions guided the research:

1. How should project-based learning be structured as part of a Consumer Studies teacher preparation module?
2. How does the implementation of project-based learning contribute positively to the development of Consumer Studies pre-service teacher preparation?

The purpose of this paper is to report on the resultant framework that was developed for the planning and preferred structuring of project-based learning in the preparation of Consumer Studies student-teachers, as well as how the students in the module perceived the process.

Research design

A qualitative case study, underpinned by a constructivist worldview, was used. The construction of the learning process as part of a planned PBL strategy was the main consideration of the study being reported on. Understanding how knowledge and learning is constructed as part of a particular teaching/learning strategy, and the contribution of each part of the process to the whole learning experience of students, were key in the research. The case was bound by Consumer Studies subject specialisation, and limited to the Consumer Studies teacher preparation module as part of a PGCE qualification at one South African university. All students for the module in 2013, 2014, 2015 and 2016 were invited to participate in the study. The students were all female, between the ages of 22 and 26, and had each completed a prior degree that was aligned with Consumer Studies content. Appropriate permissions and ethical approval was obtained from the relevant Ethical Committee for conducting the research, and informed consent was obtained from participants.

To address the first research question, the study commenced with a broad literature review to analyse and compare designs for the structuring and implementation of PBL being utilised in other subject fields. Qualitative analysis of the PBL designs found in literature, in combination with the requirements for Consumer Studies teacher preparation, were used to identify and develop several sequenced steps. These steps were used to construct an initial framework for the scaffolding of PBL as main teaching/learning strategy in the Consumer Studies teacher preparation module. The Consumer Studies teacher preparation module content was restructured to align with the PBL framework and was implemented in 2013. The restructuring involved apportioning more responsibility to the students for their own learning, which required the lecturer to carefully scaffold the module content to support students in attaining its outcomes. The lecturer also had to consider and apply the requirements of PBL, such as developing a problem that would guide the learning, determining what type of product would be acceptable to address the problem, as well as how the whole PBL process would be assessed formally, without compromising the students' learning of the original module content. As part of the PBL process, specific tasks were set for students to complete individually and in a group. Using feedback from the students in the module, the steps and resulting framework for PBL in Consumer Studies teacher education was refined over the subsequent four years.

To address the second research question, how the implementation of project-based learning could contribute positively to the development of Consumer Studies pre-service teacher preparation, all students in the module for 2013, 2014, 2015, and 2016, were invited to participate. Data was collected about students' experiences and thoughts regarding PBL as teaching/learning strategy using a variety of strategies, including focus group sessions, individual interviews, and the completion of documentation, such as weekly project sheets, student reflections, and weekly journals. Focus group sessions and interviews were planned around semi-structured questions aligned with the requirements of PBL and Consumer Studies education, and was recorded digitally and transcribed verbatim. The analysis of all these data sources was supported by the utilisation of Atlas.ti software which, according to Friese (2012), saves time and contributes to the validity of the findings.

Findings and discussion

From the literature, six existing PBL designs, each comprising of a number of detailed steps, design principles, elements or processes, were selected, analysed and compared for similarities and differences. These six designs contain detailed descriptions regarding the structuring of PBL and were analysed: Barron et al. (1998); Begay, Bender, Stemkoski, Raines, and Walker (2006); Grant (2002); Mergendoller et al. (2006); Roessingh and Chambers (2011); and Stix and Hrbek (2006) (Table 1). From these an initial framework was developed for PBL in Consumer Studies teacher preparation in 2013. The initial framework was adapted and improved in subsequent years based on the students' feedback regarding their learning in the module, as well as the experiences of the students and lecturer of PBL as a teaching/learning strategy.

The findings are discussed in two sections, aligned with the research questions. In the discussion of the findings, the lecturer of the module is referred to as the facilitator. Comments from participants

that were made in the Afrikaans language, were translated verbatim and used as quotes to support the findings.

Table 1 Overview of steps or elements in existing PBL strategies

| | Barron et al. (1998) | Begay et al. (2006) | Grant (2002) | Mergendoller et al. (2006) | Roessingh & Chambers (2011) | Stix & Hrbek (2006) |
|---|--|--|--|---|--|--|
| 1 | Setting learning goals | Outlining purpose and objectives | Introduction to "set the stage" | Launch project, orientate learners, clarify details | | Setting the stage using real-life examples |
| 2 | Scaffolding to support teaching and learning | Focussed research, develop a plan for carrying out the project | Challenging task guiding problem; collaborative groupwork | Guided instruction, merged with the project process. Facilitate resource usage, define and manage progress, scaffold work | A central problem is a catalyst for learning | Design project |
| | | | Guidance and scaffolding is provided to support learners | | Explicit teaching and learning objectives | Discuss and gather background information |
| 3 | Participative behaviour | Problem-solving and collaborative work | Identifying and using resources | Project conclusion: presentation of the project and summative assessment; learners reflect on the process and learning which took place | Promote critical reflection and higher-order thinking skills | Constructing projects |
| | | | Process to solve problem, include critical thinking and higher-order thinking skills | | | Preparing project presentations |
| 4 | Self-assessment, reflection, revision | Artefact produced. Reflect on and evaluate work | Reflection on what was learned | | Continuous assessment and monitoring of learning | Presenting projects |
| | | | | | | Reflect on process, evaluate projects |
| 5 | | Connecting learning to real-life situations. Critical and creative thinking skills applied | | | Learning tasks are authentic and engaging | |

Planning and structuring of project-based learning

The preferred framework for the planning and scaffolding of PBL in Consumer Studies teacher preparation that emerged and was refined from the research is shown in Figure 1. To effectively structure PBL, a great deal of planning should precede the implementation thereof, to ensure all the requirements of PBL are adhered to, and to gain the most benefits from PBL as teaching/learning strategy. Habók and Nagy (2016) affirm the importance of careful planning for effective PBL, stating that it is time-consuming and requires great attention to detail. During the planning phase, the facilitator determines the depth and breadth (scope) of the PBL project, which is informed by the amount of time available, the depth and breadth of knowledge and skills to be developed, and the weighting of the project as part of formal assessment. The facilitator formulates or selects a real-life problem that will guide and orientate the PBL project and outlines the specific subject knowledge and skills, as well as the particular 21st century skills that should be developed as part of students' learning. Other administrative and organisational planning at this stage includes planning how and when assessment will be included as part of PBL, as well as determining which resources will be made available to students. After the planning phase, PBL is scaffolded in four consecutive phases: introduction, structuring, designing, and presenting the product (Figure 1).

The first two phases are organised and guided to a large extent by the facilitator, with some input from the students. Involving both the facilitator and the students in the planning process contributes to the success of PBL (Habók & Nagy, 2016). Students gradually become more self-directed and

independent in subsequent phases, working almost autonomously in phases three and four of the PBL project.

Each phase is followed by purposeful formative assessment in which the facilitator's feedback is given to support students' learning (Figure 1). Such continuous assessment were noted as one of the guiding principles used by Roessingh and Chambers (2011) in their development of PBL instruction strategies for teachers. Feedback from the facilitator support students' learning (Mc Sweeney & Gardner, 2014; Roessingh & Chambers, 2011). Students also give feedback and reflect on their own learning and the learning process in a structured manner, which the facilitator can use to adapt the PBL strategy if necessary, as was done in this study. Formative assessment and feedback increases students' involvement in their own learning, as well as their achievement (Mc Sweeney & Gardner, 2014). Smith and De Zwart (2016) mention that the development of critical reflection skills is an important part of teacher preparation in the field of Consumer Studies. In the current study, concise analytical rubrics, checklists and carefully planned reflection forms (to support metacognition) were found to be useful in this regard.

In **Phase One**, the PBL project is introduced to the students, using a real-life problem which students can relate to. The problem guides the learning in the project and is meant to trigger students' interest and support their understanding of the importance of the learning that is included in the PBL process.



Figure 1 The preferred scaffolding of PBL in Consumer Studies teacher preparation

Slightly different problems were used in each year, but all related to challenges experienced in the teaching and/or learning of Consumer Studies as part of the South African school curriculum. The facilitator clarifies the aims and objectives of the PBL project for the students in this phase. These

should relate to content knowledge and skills, as well as anticipated 21st century skills development. Clarifying such objectives will help students to understand that the learning encompasses more than 'mere content', and that it is structured and purposeful. Such an introduction should support students in setting their own learning goals in relation to the PBL aims and objectives, which in turn contributes to self-directed learning. One participant stated that "I set challenges to myself, which motivated me to achieve them." Smith and De Zwart (2016) refer to bringing the student into the process of inquiry—a phenomenon becoming more and more apparent in current teaching/learning strategies. Another of the students noted "I absolutely applied self-directed learning. Our lecturer provided guidance, but I decided myself what I would use for my project and what not, and I determined what I learned from this..."

In **Phase Two**, the project is scaffolded or constructed in a meaningful way, incorporating input from the students. The different aspects of the anticipated learning embedded in the PBL project, in combination with aspects such as timetabling, the students' formal assessment schedule and public or university holidays, are considered and discussed to develop a suitable schedule for the completion of all phases of the project. At least some (if not all) of the learning in PBL should take place in collaborative groups (Habók & Nagy, 2016), and the planning of groups take place during this phase, when students have a better understanding of the anticipated learning as part of the project. It was found that the collaboration is noticeably more functional if students choose their own team members for groups than if the facilitator handles this aspect. Each year, the students in the module were divided into small groups of four to six students, which worked best in our study.

In **Phase Three**, students identify and select resources (in addition to those made available by the facilitator), which they will utilise in developing a solution for the PBL problem. They design and develop potential solutions (typically in the form of a product or service) for the problem that was stated at the start of the project. The learning of content knowledge and skills, as well as 21st century skills, are planned and embedded in the analysis of the problem and the designing of potential solutions. At this stage, the guidance of the facilitator is imperative to support students in the development of critical and creative thinking, problem-solving and other skills, such as effective teamwork and communication. Carefully structured learning tasks contributes to facilitating increasingly higher cognitive demands (Roessingh & Chambers, 2011).

In **Phase Four**, students finalise their product and formally present the product, as well as the PBL process they followed to arrive at their final product. The product is supposed to provide a solution to or address the initial problem that was set to guide the learning in the PBL project. Students assess themselves regarding their learning process, as well as the potential of their product to effectively address the problem. Habók and Nagy (2016) stresses the value of self-evaluation as part of PBL and as an *essential skill in the 21st century*, which sustains its inclusion in the PBL framework developed in this study. In addition, peer assessment is utilised to give feedback on presentations, products and possible alternative solutions. This is in line with suggestions by Habók and Nagy (2016) that peer assessment contributes to the effectiveness of PBL, as peer pressure is so important in young people's lives. In addition, Roessingh and Chambers (2011) found that peer assessment contributes to deep learning, which is essential in teacher preparation.

Formal summative assessment follows this phase, usually consisting of a comprehensive analytical rubric that includes the aims and objectives set for the project, with various levels of attainment indicated. As recommended by Roessingh and Chambers (2011), all assessment rubrics were made available to students at the start of the PBL.

The positive contribution of PBL to the development of Consumer Studies pre-service teachers

The reflections of students over the past four years, in the form of written text, completed documentation, as well as verbal comments, have shown that they enjoy PBL because it is well-structured, life-relevant and have clear and attainable aims and objectives. Students enjoyed feeling "more in control of their own learning" and felt "empowered" by the knowledge that 21st century skills, which would be useful to them in many other aspects of their lives, were explicitly being developed in the PBL project. One of the students said "As a student that have just finished my PBL project, I cannot begin to describe how much I learned during this process. I am not only talking about the knowledge that I have gained, but also the skills that I developed." Habók and Nagy (2016) reported similar positive outcomes and that teachers in practice often prefer PBL as teaching/learning strategy. In line with their findings, over the years as part of submitted reflections,

interviews and completed documents, several students in this study commented that they would “remember the content knowledge and skills better” (than they would have with other teaching/learning strategies, such as lecturing), and were of the opinion that they “would be able to implement [such] knowledge and skills more effectively in [their] own classes one day” (when they became Consumer Studies teachers in schools). These findings also relate to the finding of Mc Sweeney and Gardner (2014) that one of the aims of Home Economics education (closely related to Consumer Studies) is that students will take ownership of their learning and will retain that learning for life. All these feedback comments, but especially the last one, supports the suitability of PBL as an effective teaching/learning strategy for the preparation of Consumer Studies student-teachers for the profession.

Conclusion

Project-based learning is well-suited as main teaching/learning strategy for the preparation of Consumer Studies student-teachers. Students enjoy PBL and find the benefits thereof useful for their own personal development, as well as for the application possibilities thereof in their future careers as teachers. The active, learner-centred approach aligns suitably with the requirements set out for Consumer Studies education, fosters the development of desirable 21st century skills which student-teachers will need to function optimally, and involves students deeply in their own learning process. Meticulous planning of PBL prior to its implementation, and phasing the PBL process in a structured manner, supports its effectiveness as a teaching/learning strategy. Formative feedback from both the facilitator to students, and from students to the facilitator, together with continuous assessment, augments the strategy.

Although there are a number of suggested structures for PBL, this framework, developed from the literature and augmented with feedback from the students and facilitator in the study, has suited the Consumer Studies teacher preparation module the best over the past few years and we will continue to use it as main teaching/learning strategy. The planned and structured guidance that allows for learning of knowledge and skills required of Consumer Studies teachers, together with the perceived value the process contributes to these pre-service teachers’ preparation for the profession, supports this conclusion. Further opportunities exist for research in this field, including on-going research focussing on the use of technology to support teaching and learning in the PBL strategy as part of Consumer Studies teacher preparation.

Biography

Adri Du Toit is a lecturer at the Potchefstroom Campus of the North-West University in South Africa. She specialises in preparing students as Consumer Studies and Technology teachers. Her research interests include curriculum development and analyses, pedagogy and entrepreneurship education. Adri has been involved in the education of Consumer Studies and closely related subjects in this field in both South Africa and the United Kingdom. She is currently heading a multi-national project for the benchmarking of the Consumer Studies curricula of South Africa, Botswana, Lesotho and Swaziland.

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