

APPLYING THE DESIGN PROCESS TO APPAREL PROTOTYPE DEVELOPMENT: STUDENTS' EXPERIENCES OF A COMMUNITY SERVICE-LEARNING PROJECT

Mariette Strydom* & Thea J Tselepis

OPSOMMING

Studente se ervaring van 'n diensleer projek word in hierdie artikel beskryf. Die vennootskap tussen 'n akademiese departement en 'n sosiale entrepreneur het geleentheid gebied om finalejaar-studente aan die realiteit van kleding-produkontwikkeling bloot te stel. Amajobjob is 'n sosiale entrepreneur wat basiese lewensvaardighede ontwikkel deur 'n reeks opleidingsprogramme, waaronder basiese klerekonstruksie, aan te bied. Deelnemers aan die program kan na voltooiing 'n langbroek, of te wel **African Happy Pants™**, vervaardig. Dit is 'n trots Suid-Afrikaanse langbroek, gemaak van 'n unieke, kleurvolle materiaal wat die ritme van Afrika weerspieël. Amajobjob verskaf uitgeknipte patroondele en ander rou material aan opgeleide deelnemers. Die individue maak dan die langbroeke en word vir hul arbeid betaal, terwyl Amajobjob die verkope behartig. Op hierdie manier kan die individue hul eie inkomste bepaal. Amajobjob beskik egter nie oor die nodige vaardighede om nuwe produkte te ontwerp en ontwikkel nie. Verbruikerswetenskap-studente wat speisaliseer in die Kledingbestuurprogram, kon egter die gaping in die vaardighede aanvul.

Finalejaarstudente wat ingeskryf was vir die produkontwikkeling-vak het die uitdaging om die produkreeks te verbeter en uit te brei, aanvaar. Studente ontwikkel hoër kognitiewe vaardighede gedurende die produkontwikkelingvak. Kritiese denke wat vaardighede soos ontwerp,

analise, sintese en evaluering insluit, word verder ontwikkel. Die voordeel van projekte wat op werklike probleme gebaseer is, is dat dit aan die student die geleentheid bied om praktiese ondervinding op te doen, en werkverwante vaardighede toe te pas.

Die doel van die projek was om die bestaande klere-produkreeks van 'n sosiale entrepreneur uit te brei en/of te verbeter, en om die studente se ervaring van die realiteit van produkontwikkeling te beskryf. Die projek het studente in staat gestel om teoretiese en praktiese kennis wat in die Verbruikerswetenskap Kledingprogram bekom is, in die produkontwikkeling-vak toe te pas.

Die navorsingsontwerp was deelnemende-aksie navorsing en aktiwiteite is gestruktureer volgens 'n ontwerpproses wat op kledingprodukontwikkeling van toepassing is. Sewe-en-twintig studente wat vir die vak ingeskryf was, het aan die projek deelgeneem. Om te bepaal hoe doeltreffend die produkte ontwikkel is, is die studente se eweknie-evaluering ("peer evaluation") van die finale produkte met Amajobjob se keuse van produkte vergelyk. Na voltooiing van die vak moes die studente 'n geskrewe refleksie oor hul ervaring inhandig, en dit is deur middel van inhoud-analise ("content analysis") ontleed.

Die positiewe impak van diensleer is in studente se geskrewe refleksies bevestig. Die inhoud van die refleksies het 'n positiewe ervaring ten opsigte van ontwerp, produksie, toepassing van

kennis, groepwerk en sosiale verantwoordelikheid uitgelig. Teoretiese en praktiese uitkomst is bereik, wat terselfdertyd 'n positiewe leerervaring en bydrae tot die gemeenskap gemaak het. Twee-en-twintig van die 67 produk-idees is deur die sosiale entrepreneur gekies om die bestaande produkreeks uit te brei en dui daarop dat die studente die behoeftes van die sosiale entrepreneur, asook die handelsmerkebeeld op 'n doeltreffende manier geïnterpreteer en in die eindproduk toegepas het. Die uitbreiding van die produkreeks fasiliteer werkskepping, wat tot voordeel van die gemeenskap sal wees. Die studente is bevoordeel deur die kombinasie van diensleer-aktiwiteite met die akademiese kurrikulum, en die gemeenskap is bevoordeel deur die uitbreiding van die produkreeks en moontlike werksgeleenthede. In 'n multidissiplinêre vakgebied soos produkontwikkeling waar teoretiese en tegniese vaardighede toegepas word, kan gemeenskapgebaseerde diensleer 'n nuwe dimensie aan die opleiding van Verbruikerswetenskaplikes bied.

— Ms M Strydom*

*Department of Life and Consumer Science
University of South Africa*

Tel: +27 (0)82 824 6577

Fax: +27 (0)11 471 2976

Email: strydm1@unisa.ac.za

** Corresponding author*

— Ms TJ Tselepis

F Wilson Fashion Design Institute

Tel: +27 (0)83 226 5808

Email: thea@fwilsonfashion.co.za

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BACKGROUND

The role of service-learning in tertiary institutions

Service-learning provides a credit-bearing educational experience that includes experiential learning while performing projects related to real-life problems (Govekar & Rishi, 2007, Eyler & Giles, 1994). Students participate in service-learning activities to meet people's needs, but also reflect on these learning activities to gain further understanding of the course content. The result is a broader appreciation of the subject discipline as well as an enhanced sense of social responsibility (Bender & Jordaan, 2007; Bringle & Hatcher, 1996). Therefore projects based on real life problems can contribute to practical experience as well as application of work-related skills.

Service-learning projects are often challenging and therefore useful to educate young people about skill application in real-life situations (Asler, 1993). These challenging situations are beneficial to both the providers (students) and recipients (community) of the service performed (Furco, 1996:6), because the activities involved in a service-learning approach increase the likelihood that students will retain concepts and recognize the benefits of academic activities, but at the same time address the specific community needs (Van Wynsberghe & Andruske, 2007; Furco, 2002:28; Junk, 1990). The contribution to student learning and benefits to the parties involved however, can outweigh the challenges.

The partnership between Department of Consumer Science and industry partners like Amajobjob

Tertiary institutions and community development organizations often form partnerships to initiate service-learning programs which will benefit all parties involved (Billig, 2007:27). A partnership

between the Department of Consumer Science (at the University of Pretoria) and a social enterprise (Amajobjob) provided the opportunity to expose students to a product development service learning experience.

Amajobjob is a social entrepreneurial hub that focuses on skills development by offering a range of training programmes that extend over a six-month period. The trainees are mostly beggars, unemployed and less fortunate people. Recycling and re-use of materials is an important consideration and is part of the brand image for Amajobjob, due to the limited resources available to them. One of the typical training programmes offered by Amajobjob is a basic apparel construction programme. Due to the background of the trainees their skills, even after the basic sewing training, are very limited. The only apparel product constructed in this programme was trousers or **African Happy Pants™**. This is a proudly South African, playful, casual, unisex trouser with a unique colourful print, which reflects the rhythm of Africa. Participants that complete training at Amajobjob are able to produce the trousers on their own machines at home. A limited number of machines are available at Amajobjob's premises. Amajobjob supplies them with cut out pattern pieces and other raw materials, and they can sew at their own pace. Amajobjob pays for the labour provided for each completed unit. In this way participants are able to determine the income that they receive through the number of garments produced in a certain period of time. The products are then sold by Amajobjob. In other words the trained participants are not employed by Amajobjob, but are self-employed. The existing apparel construction programme did however not address the entrepreneurial skills necessary to establish a successful brand image. Furthermore, no skills training to enable the design and development of a complete **African Happy Pants™** range (including tops and accessories), was offered. A project that entailed the developing of products to expand and improve the **Afri-**

can Happy Pants™ brand, were given to final year B Consumer Science Clothing Management students enrolled in the KLR 411(Product Development and Entrepreneurship) module.

Universities that offer the multidisciplinary Consumer Science programmes in product development have the potential to fill this gap. Therefore, a partnership was formed between Amajobjob and the Consumer Science Department of the University of Pretoria (specifically Clothing Management final year students). The university's students enrolled in the capstone product development and entrepreneurship course were challenged to design innovative products for the Amajobjob project. These products were to be produced by people enrolled in the Amajobjob apparel construction courses.

The University students obtain higher-level cognitive skills during the product development course. These critical thinking skills include design skills like analysis, synthesis and evaluation (Au *et al*, 2004). The advantage of this application of skills in the Amajobjob project is that real-life problems are solved and advanced technical skills are developed. The advantage for the community is job creation, improvement of the quality of products and enhancing the brand image. When both parties benefit from these academic activities, not only is experiential learning obtained, but service-learning is also achieved (Govekar & Rishi, 2007; Furco, 1996:6). Furco (2002:25, 42) recommends partnerships as a strategy to enhance the academic curriculum and promote theory-practice connections.

THEORETICAL FRAMEWORK: PRODUCT DESIGN IN ACTION

Product development includes the strategic, creative, technical, production and distribution planning of goods that have perceived value for spe-

cific consumer groups (Keiser & Garner, 2008:4). A designed product can only be regarded as effective if the consumer needs are addressed and satisfied. Effective product design can be linked directly to innovation since innovation includes application of new ideas or better ways of doing things (Longenecker *et al*, 2003:19; Nieman *et al*, 2003:15). The design process design is the foundation of the product development process.

Design is a conceptual process (Chanet *al*, 2011; Owen, 2001). "Design is about ideas: needing and finding ideas, examining and identifying their nature, and, most important, illustrating and explaining them so they can be realised" (Aspelund, 2010:5). To design entails to engage a plan of action implemented to solve a problem that needs solving. This plan of action is implemented during a design process that can be viewed as the path implemented to solve the problem (Goldschmidt & Sever, 2011). This path has "well-defined stops along the way" so that designers can examine their decisions and ideas in each phase of the design process (Aspelund, 2010:3; Regan *et al*, 1998). A design process includes a pre-production process which includes the phases/stages implemented to plan a product-concept (Rath *et al*, 2008:5; Au *et al*, 2004).

Progression should be made during a design process towards the product-concept which is the final stage before implementation/production (Lloyd & Scott, 1994). Therefore each design phase can be viewed as a step towards the product-concept. Nonetheless loops may occur during the design process which may call for redefinition of some phases occurring before the action in the next phase is concluded (Aspelund, 2010:6; May-Plumlee & Little, 1998). An important aspect that one can derive from the definitions of design processes in general is that it is not one single action, but a chain of various actions demanding redefinition of ideas until a design-concept is established.

The design process requires research of existing product ranges and the target market needs, as well as an understanding of general market conditions. Furthermore, analysis of the brand positioning in the market, the limitations of the manufacturers, and availability of resources should be researched. Synthesis of gathered and analysed information includes the combination of creative and technical development; a crucial part of product development and marketing of a business (Desmet & Hekkert, 2007; Black & Baker, 1987).

From the above it can be derived that product development includes a large amount of pre-production planning and design skills as well as specific business skills such as marketing (including sound knowledge of the consumer). However, the business skills should also be applied during the design process of the products, to ensure that the prototype is worth further development.

A recognised engineering design process applicable to apparel is the design process proposed by Regan *et al* (1998). This design process has seven phases: 1) identification of the problem, 2) definition of the problem, 3) exploration of the problem, 4) search for alternatives, 5) evaluation and decisions, 6) specification of the solution and 7) communication of the solution. The first two phases are closely related since they revolve around the problem and the delineation thereof (Regan *et al*, 1998). Therefore these phases were combined for this study. Furthermore the phase that includes the search for alternatives was combined with the evaluation of ideas, because these two phases take place nearly simultaneously. Finally the specification of the solutions in this case was seen as part of the communication phase because students had to provide product specifications to communicate their product-concepts (solutions) clearly.

PROBLEM STATEMENT AND AIM OF THE STUDY

The purpose of this paper is to describe a real-life project which involved student's active participation in their learning process. The **African Happy Pants™** product range needed to reflect the brand image and consequently evoke a positive emotion in the wearer. The brand should also comply with good quality construction standards, such as SABS 0101-1968. Amajobjob needed the product line to be expanded to include a complete range of good quality apparel and -related items. It is important to note that this was not an apparel manufacturing project; implementation or production of the selected prototypes and sales of the final products was not expected of the students. The project required that students develop prototypes of their ideas. Detailed costing, including all raw materials, packaging, labels and labour, was included in the specifications for each prototype. Production planning, including limitations of manufacturers and availability of resources were addressed in the specifications and detailed production steps and instructions for each prototype. Market assessment (existing ranges, target market, general market conditions, brand positioning) distribution planning and projected sales were addressed in the business plans. The aim of the study was to explore student's experiences of a real-life product development project, and to expand and improve the existing product line of the social entrepreneur.

RESEARCH DESIGN AND METHODS

This study followed a qualitative approach with the participatory action research design (PAR). PAR is a cyclical, reflective process and members of the subject are involved in the whole process. PAR is often used in emerging world conditions and therefore often used in a South Afri-

can context (Babbie & Mouton, 2001:314-315). This particular research design was thought to be appropriate for the study since it is commonly used as an approach to people's development as well as interventions (Babbie & Mouton, 2001:314).

The principles of PAR, as set out by Babbie and Mouton (2001:314-323), applicable to this study were as follows:

- 1) The researchers were the change agents that initiated the PAR.
- 2) The participants who collaborated with the researchers took co-ownership and shared power with respect to the process and the product of the research.
- 3) The participants' local knowledge and their perspectives on their situation and environment were incorporated in the research process and recognised as valid.
- 4) The knowledge that was generated for action in PAR which was explicitly considered to lead to practical, social actions and/or change.
- 5) Knowledge creation and the actions generated set the foundation for empowerment.

Twenty seven students were enrolled in the KLR 411(Product Development and Entrepreneurship) module and participated in the project. Written reflections were analysed using content analysis. Peer evaluation of the final products was used to determine the effective development of prototypes. Close contact was maintained with Amajobjob throughout the semester. However Amajobjob were not required to formally assess prototypes, they selected the products which they thought had a good probability of being successful in the market. When Amajobjob selected a prototype which also received a high score during the students' peer evaluation, it indicated that the students had a good understanding of what was expected and that the students interpreted the context, namely brand image and constraints, in a satisfactory way.

Methods and teaching strategies: applying the design process

The final year undergraduate students were divided into 12 groups of two or three students and were assigned to develop at least five new or improved product ideas, consisting of garments and accessories. Throughout the semester, existing products, posters, brochures and fabric off-cuts were available in class to serve as inspiration for the project.

Learning activities The design process of Regan *et al* (1998) was applied to structure the learning activities. This design process was applied from a manufacturing perspective, as well as from both the consumer point of view and the social entrepreneur's perspective of the brand image that had to be portrayed.

Problem recognition and definition The spokesperson for Amajobjob was invited to speak to students to explain the concept, background and vision of **African Happy Pants™**, as well as the need for the project. Students were to understand that: **African Happy Pants™** is a proudly South African product (therefore mobilised job opportunities), **African Happy Pants™** has a relaxed, casual, laidback feel, **African Happy Pants™** enables the wearer to step into the rhythm of Africa (image/style), and **African Happy Pants™** carries a social message, namely that one makes a difference by empowering poor people if one buys and wears a product from the prospective product range.

Students examined the existing **African Happy Pants™** trousers to gain experience of the fabric, quality and style. A class discussion followed on their impressions of the product quality, product image and possible target market. They identified possible problems and areas that needed improvement and each group leader documented these as a starting point for the design process.

Students were expected to improve the product

concept of the current trousers and come up with ideas for other complementary products in the **African Happy Pants™** product range, for instance tops and accessories. An emphasis was placed on the limited skills and resources of the Amajobjob hub (the design constraints), therefore incorporating off-cut fabrics or recycling other materials were strongly recommended. This step served as the problem identification phase of the project (creative process) which required that students had to clearly state the problem, create ideas around the problem and generate possible solutions on paper (Regan *et al*, 1998). Students generated ideas of possible product concepts by submitting rough sketches. A panel of lecturers assessed these sketches. Feedback on these initial product concepts was that students had to re-think their ideas and to think more innovatively ("out of the box"). The ideas lacked originality and did not reflect the brand image sufficiently.

Exploration of the problem To facilitate students to "step into the rhythm of Africa" and to explore the problem, a field trip to the Amajobjob hub was undertaken. Students had the opportunity to experience the creative environment of this hub and direct their questions to the people involved in the apparel production programmes. Assumptions were made regarding the affordability of the possible new products. The design strategy was evaluated with regard to the target market's preferences, brand image and style of existing products. Specific objectives were then set for the potential products with regard to the level of skill required for production. Initial ideas were revised and altered and rough technical drawings of product concepts were submitted.

Search for alternatives and evaluation of ideas The third step in the design process was to search for alternative ideas (Regan *et al*, 1998). Rough drawings were returned to the groups, indicating the concepts chosen by the panel to be most likely to succeed if developed further. The panel assessed the concepts by keeping in

mind the skills level required, limited raw material resources, the target market and the brand image. The panel's selection of a product was made only to provide an indication of the viability of the product and groups were still allowed to choose any five design ideas or even generate new ideas after having group discussions about their design concepts. Different groups paired up to compare and assess different ideas and the chosen concepts. Peer assessment was also implemented in an attempt to evaluate the significance of the concepts with regard to the theory. Evaluations were based on reasoning about the product application in the Amajobjob setting and verifying the value of the concepts with regard to the brand image and possible job creation. Consequently, old ideas were refined or new ideas were initiated. Knowledge from several areas (textiles, pattern design, marketing and business management) was applied during group discussions and final concept decision.

Specification and communication of solution

This phase included a written justification, storyboards, fashion sketches, product specifications and prototypes. Once the final five design concepts were chosen, each group had to submit a written report to justify and illustrate their choices. The report included the following:

- A discussion of their perception of the current brand image of Happy Pants products, and where they assumed it should be positioned. Students had to justify their opinions.
- An explanation and classification of the target market
- A justification of the chosen design and styling so that the prototypes have a competitive advantage.
- Fashion and technical drawings that reflected the true fabric and colour of the intended prototypes, as well as the brand image that they are trying to promote.

Detailed product specifications which included

the following documents for each design: Style summary sheet, Preliminary costing sheet, Materials specifications, Pattern block identification, Graded measurements and Assembly specifications.

Each group had to produce prototypes of the design concepts that they chose to develop. Within the group, students had to divide tasks fairly according to the skills and preferences of each group member. They were allowed to make use of the seamstresses at Amajobjob to assist them with the production of professional prototype garments.

Finally, a set of visual and written instructions of the production steps for each prototype had to be submitted electronically. The purpose of these instructions was for Amajobjob to use when training participants, to have the skills required to produce the specific product. Since the trainees are often illiterate, clear and self-explanatory visuals were essential. Students were really challenged to think of every possible step because people with no production or sewing skills are not able to figure out the next logical step by themselves.

Once all the groups completed their sample products, each prototype was provided with a unique code and displayed in class as if in a Happy Pants 'store'. A cost sheet was developed for each prototype as part of the specifications. This costing included raw material, findings, trimmings, packaging, labour and a 100% mark-up on the total costs, to determine the wholesale price of each prototype. The retail price was calculated by adding a 100% mark-up to the wholesale price. The students then evaluated each prototype from an end-user viewpoint. Students had to rate the given criteria on a five point Likert-type scale where five was "excellent" and one indicated "discontinue." The criteria, as adapted from Brown and Rice (2001:47-51), included price/value for money, quality/finishing, aesthetics and functionality.

The course concluded with the writing of a business plan as an individual exam assignment. After the exam project was completed, the students were asked to reflect on the overall project and submit their comments about the project in writing. No specific guidelines were given and the students were free to give a general overview of their experiences.

RESULTS AND FINDINGS

Expanding of the existing product range of Amajobjob

Of the 67 prototypes that resulted from the project, 22 were selected by Amajobjob to expand and improve their existing product range.

Table 1 gives a summary of the number of prototypes developed in each category, as well as the number of prototypes from each category that was selected by Amajobjob to be added to the **African Happy Pants™** product range.

Tables 2 to 5 reflect the average of the total scores allocated during the peer evaluation by the 27 students. Only products that were selected by Amajobjob to expand their product range are included in the Tables.

Miscellaneous prototypes developed by the students included cases, bags, toys, armband, coasters and sandals (Table 2). All the selected prototypes had an average score of above 80%, except the pocket armband, which had a score of 68%. This lower score was due to finishing and construction that was not up to standard, and therefore, the score for quality lowered the average score of the prototype.

The bag in Table 3 with the lowest score was again the result of careless construction and finishing, which lowered the perceived quality of the prototype. The other two bags had an aver-

age score of more than 80%.

All the selected clothing items illustrated in Table 4 had an average score of 75% and higher.

The jewellery in Table 5 that were selected by Amajobjob all had an average score of at least 85%.

The agreement between peer evaluated prototype scores and selection by Amajobjob, indicates that the students understood and applied the perspective of Amajobjob correctly. Amajobjob were not required to formally assess or score prototypes. They selected the prototypes which they thought had a good probability of being successful as part of the brand and in the market. A selected prototype which also received a high score from the students (who evaluated the prototypes as if they were the end-users), indicate that the students had a good understanding of what was expected, and interpreted the brand image, the target market and the constraints in a satisfactory way. The fact that the prototypes that received the highest scores (with two exceptions namely the pocket armband and the black bag) were also the ones selected by Amajobjob, also proves that the students are able to interpret and evaluate the different prototypes in terms of the criteria as adapted from Brown and Rice (2001:47-51), but also from an end user viewpoint. These are very important skills that Consumer Scientists and specifically product development professionals need, to ensure a successful career. These results confirm how valuable the project is in terms of equipping the students with a better understanding of the fashion industry.

Students contributed to the social entrepreneur's work by developing prototypes with the potential to be added to the existing range of products, as well as by providing detailed specifications, patterns and the exact instructions of how to produce these prototype products. This information provided Amajobjob with the opportunity and

TABLE 1: NUMBER OF PROTOTYPES DEVELOPED AND SELECTED BY PRODUCT CATEGORY

| Product categories | Total prototypes developed | Total prototypes selected |
|---------------------------|----------------------------|---------------------------|
| Garments / Clothing items | 20 | 9 |
| Jewellery | 14 | 4 |
| Bags | 14 | 3 |
| Miscellaneous | 19 | 6 |
| Totals | 67 | 22 |

TABLE 2: AVERAGE PEER EVALUATION SCORES OF MISCELLANEOUS SELECTED PROTOTYPES


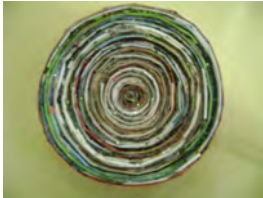




| Prototype Name | Average score out of 20 | Prototype Name | Average score out of 20 |
|--|-------------------------|--|-------------------------|
| Sandals  | 18.4 92,0% | Paper coaster  | 18.1 90,5% |
| Sunglass case  | 17.7 88,5% | Elephant toy/cushion  | 17.5 87,5% |
| Jewellery bag  | 16.4 82,0% | Pocket armband  (Fabric armband that forms a small pocket – to carry valuables on your arm when participating in sports or other activities) | 13.6 68,0% |

TABLE 3: AVERAGE PEER EVALUATION SCORES OF SELECTED BAGS

| Prototype Name | Average score out of 20 |
|--|-------------------------|
| Drawstring bag  | 18.7 93,5% |
| Shade cloth clutch bag  | 16.8 84,0% |
| Black bag  | 12.7 63,5% |

knowledge to train new potential participants. Twenty-two of the 67 prototypes were identified by Amajobjob as having the potential to satisfy the needs of the target market, to sell at the right price and to be profitable, and therefore these products were selected to be added to the existing product range. These prototypes were presented to a retailer who now shows an interest in stocking Amajobjob's products. Creating new products may lead to new jobs being created, and in this way the students achieved the outcome of contributing to community organisations (Van Wynsberghe & Andruske, 2007). The contribution to the community, in the form of job cre-

ation, will be evident when the scale of production for a retail order requires extra trained participants to produce products at the required rate. Through the process of actively taking part in their learning, students achieved real objectives for the community and developed a deeper understanding of the real-life problems at hand in their future careers (Jaques & Salmon, 2007:67; Dumas, 2002).

Students' experiences of the real-life community-based product development project

Twenty six students submitted their reflections in an evaluation portfolio. The content of all the reflections was analysed and themes were identified. The written reflections were categorised according to the identified themes. The themes identified included their general experience of the project, group work, application of previously acquired academic knowledge and social responsibility. Comments with regard to the identified themes were coded as positive, negative or no response as illustrated in Table 6.

No negative comments were reported regarding any of the identified themes, or other aspects of the project. Twenty-four of the 26 students reported having a positive experience by participating in the project, and 21 of the 26 students reported that they needed to apply knowledge gained during their years of study.

From some of the student's comments listed in Table 7, one can clearly see that the students experienced the project as fun, interesting and exciting. The students realised the value of experiencing the real world and therefore, one can assume that the active participation in the project contributed to the learning process in a positive way and that learning took place through experience or action. This corresponds with the principle of active participation by students and achieving the outcome of learning through action, as illustrated by Jaques and Salmon (2007:64) and Van Wynsberghe and Andruske

TABLE 4: AVERAGE PEER EVALUATION SCORES OF SELECTED CLOTHING ITEMS

| Prototype Name | Average score out of 20 | Prototype Name | Average score out of 20 |
|--|-------------------------|---|-------------------------|
| <p>Zip tank top</p>  <p>(Decorative use of zips to create Africa motif)</p> | <p>17.3 86,5%</p> | <p>A-line smile top</p>  <p>(Printed fabric in the form of a smile outlines an inside pocket)</p> | <p>17.3 86,5%</p> |
| <p>Children's dungaree</p>  | <p>17.2 86,0%</p> | <p>Children's Happy Pants</p>  | <p>17.0 85,0%</p> |
| <p>Children's waistcoat (reversible)</p>  | <p>16.8 84,0%</p> | <p>Children's skirt</p>  | <p>16.8 84,0%</p> |
| <p>Bauble vest</p>  | <p>16.3 81,5%</p> | <p>Unisex top</p>  | <p>15.4 77,0%</p> |
| <p>Waistcoat</p>  | <p>15.0 75,0%</p> | | |

TABLE 5: AVERAGE PEER EVALUATION SCORES OF SELECTED JEWELLERY





| Prototype Name | Average score out of 20 | Prototype Name | Average score out of 20 |
|--|-------------------------|---|-------------------------|
| Felt necklace  | 17.8 89,0% | Flower brooch  | 17.7 88,5% |
| Button bangle  | 17.4 87,0% | Button necklace  | 17.0 85,0% |

TABLE 6: STUDENTS' EXPERIENCES OF SERVICE LEARNING

| Theme | Overall experience | Group work | Application of knowledge | Social responsibility |
|-------------|--------------------|------------|--------------------------|-----------------------|
| Positive | 24 | 12 | 21 | 12 |
| Negative | 0 | 0 | 0 | 0 |
| No response | 2 | 14 | 5 | 14 |
| Totals | 26 | 26 | 26 | 26 |

TABLE 7: SELECTED COMMENTS INDICATING A POSITIVE OVERALL EXPERIENCE

| Specific sub-dimensions of positive experience | Verbatim |
|--|---|
| Fun and enjoyment | "...it was a fun learning experience..." |
| | "...fun way of experiencing..." |
| | "...was exciting..." |
| | "...thoroughly enjoyed this project..." |
| | "...enjoyed the experience..." |
| | "...it was very exciting to do this ..." |
| | "...great fun and very interesting..." |
| | "...it was nice working with Amajobjob..." |
| Sense of accomplishment | "...a lot of fun, but also educational, since we learned how the real life industry works..." |
| | "...I had a valuable life experience with the Happy Pants project..." |
| | "...the project was a major challenge, which tested our abilities and endurance..." |
| Positive exposure | "...am proud of our accomplishments..." |
| | "...gained firsthand experience in the stages of the design process..." |
| | "...wonderful to practically develop products for the organization..." |
| | "...gives one a taste of what happens in industry..." |
| | "...gave wonderful exposure to what can be expected in the real business world..." |

TABLE 8: SELECTED COMMENTS INDICATING A NEED TO APPLY PREVIOUS KNOWLEDGE

| Verbatim |
|--|
| "...made it possible for me to implement my 4 years of knowledge..." |
| "...had to demonstrate my knowledge, insight and understanding gained during previous 3 years of study..." |
| "...the application of learned principles ... led to the further development of knowledge in this area..." |
| "...a number of skills and principles were incorporated and applied..." |
| "...it was great to do in practice what we learned ..." |
| "...it tested everything I've learned from my first year..." |
| "...insight had to be applied in the execution of the project..." |

TABLE 9: SELECTED COMMENTS INDICATING A POSITIVE EXPERIENCE OF GROUP WORK

| Specific dimensions of experience | Verbatim |
|-----------------------------------|--|
| Assistance and support | "...learned that I need other people to help me in life..." |
| | "... how important it is to empower and motivate workers..." |
| | "...our group helped one another..." |
| Collaboration | "...we worked well together..." |
| | "...we learned how to cope with deadlines..." |
| Sense of belonging | "...we as a team..." |
| | "...built up a close relationship..." |

TABLE 10: SELECTED COMMENTS INDICATING A POSITIVE EXPERIENCE OF GROUP WORK

| Specific sub-dimensions of experience | Verbatim |
|---------------------------------------|---|
| Social awareness | "...became more aware of the need for jobs in the country and that the fashion industry has a lot to offer..." |
| | "...made me realize again that everything in life is hard work..." |
| | "...experience also reminded me to appreciate everything..." |
| Sense of purpose and fulfilment | "...we as fashion students could make a difference in the lives of those around us..." |
| | "...it was for a good cause..." |
| | "...experience provided an excellent example of how clothing design and manufacture can be applied with the aim of helping communities and improving sustainability in South Africa..." |
| | "...it was satisfying ..." |
| | "...to help an association with new ideas..." |
| | "...leant how one can help by making small changes in the lives of others..." |
| | "...the best feeling was to put something back into the community..." |

(2007). The students also experienced a sense of accomplishment, which indicates that the outcome of personal development was achieved.

Twenty one students indicated in Table 6 that they had to apply knowledge gained in previous courses. The selected comments listed in Table 8 reveal the challenge that faced the students as they embarked on the project. They realised that they needed to revise, use and apply knowledge from course work done in the previous three years of study. When looking at Bloom's taxonomy cited by Jaques and Salmon (2007:100,101), it is clear that a higher level of cognition is necessary to be able to critically evaluate previous knowledge, in order to apply skill and provide insight into the problem. Knowledge is a result of the transformation of experience (Kolb, 1984:41). This implies analysis and evaluation of the knowledge necessary to solve a problem, such as developing products for an existing product range. Achieving the outcome of stronger academic skills is crucial in community service-learning.

Collaboration between students and those within community organisations is one of the principles of community service-learning (Van Wynsberghe & Andruske, 2007). The selected comments in Table 9 clearly show that the students had a positive experience of group work. The group work gave the students a sense of belonging and a realisation of the importance of other people in their life. The collaboration among students contributed to their personal development, which is an outcome of community service-learning.

Van Wynsberghe and Andruske (2007) indicate that social responsibility is a principle of service-learning. The selected comments listed in Table 10 reveal that the students realised a sense of social responsibility or citizenship. This contributed to promoting personal development and fostering civic engagement, which are outcomes of community service-learning.

CONCLUSIONS AND RECOMMENDATIONS

The selected prototypes designed during this project have been implemented at Amajobjob. A good relationship was built between the social entrepreneur and the Consumer Science Department, and it proved to be a powerful partnership because after the project concluded a prominent local retailer showed interest in selling the improved Happy Pants product range.

With regard to the experience of students, it can be concluded that this meaningful service opportunity provided a sense of purpose, accomplishment and positive exposure. More specifically, connection to and usefulness within the community were the results and it correspond with the view of Fredericks and Billig (2008) who emphasise that such projects fill a recognised need in the community through tangible products. The product development and entrepreneurship module will continue to expose students to the real-world experience and challenge them to apply their knowledge through a revised and improved integrated service-learning curriculum.

With regard to the application of previous knowledge, the results clearly indicate that students applied previous skills and knowledge provided in other modules, as can be expected since product development is a capstone course. However, students also seemed to obtain outcomes directed at the higher cognitive levels of Bloom's taxonomy, namely analysis, synthesis and evaluation (Jaques & Salmon, 2007:100,101). There is evidence in the results indicating that students had to thoroughly plan the strategies which had to be implemented to develop the end products. This implies that students had to take on the perspective of the social entrepreneur and evaluate all their decisions from the social entrepreneur's point of view as well as from a consumer perspective.

From the results, it is also apparent that critical

life skills were obtained. Application of design skills in the real life scenario contributed to the students' sense of responsibility towards the community. It therefore seems that students got the opportunity to experience the core principles of service-learning and community development obtaining life skills summarised by Van Wynsberghe and Andruske (2007) as active participation, collaboration between groups of people and social responsibility. These principles and life skills develop interpersonal effectiveness, ethical values and an aptitude for teamwork. These life skills link strongly to managerial skills, which is one of the aspects of service-learning. Jaques and Salmon (2007) as well as Dumas (2002) conceptualise the dimensions of managerial skills as leadership, critical thinking, teamwork and cooperation and service-learning appears to be a promising means of developing such managerial skills. Group experiences in this community service-learning project provided students with the opportunity to increase involvement, deepen understanding and improve thinking.

Bringing the business reality into the classroom could prove to be beneficial to students because it equips them with a better understanding of the industry (Stoel & Kwon, 2003; Papamarcos, 2002). The results of this analysis indicate that service-learning offers the means to close the gap between theory and practice. This real-life product development project had all the characteristics of a community service-learning project as stated by Van Wynsberghe and Andruske (2007), namely service-learning experiences that meet actual community needs, blending of service activities with the academic curriculum, collaboration with community organizations, and reflection by students. Students benefitted from the realization that it is not only about academic knowledge, but also about the contribution that can possibly be made to the lives of other people. In a multidisciplinary subject-field such as product development where a combination of theoretical and technical skills have to be ap-

plied, community based service-learning can add new meaning and purpose to the training of Consumer Scientists.

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