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## **Taking a student's product concept idea to manufacturing industry - a case study of the learning experience for both tutor and student**

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# Taking a student's product concept idea to manufacturing industry - a case study of the learning experience for both tutor and student

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## Abstract

*This paper explores the ways in which a product design student's idea for an innovative new product, with considered real commercial potential, was taken to manufacturing industry. It is based on a student concept for an innovative adjustable hairbrush design that has been developed and submitted to relevant industries for their consideration. The idea has now been both patented and exclusively licensed to a company, Albryn of Stonehaven Ltd, for manufacture and sales of the product.*

*The areas reviewed and discussed in detail are concept development to a standard for both industrial presentation and Patent application, concept presentation with a view to licensing the product and the progression of discussions and negotiations for a licence agreement.*

*More importantly, the impact of all of these areas in terms of both the tutor and student learning experience is reviewed. The particular benefits that can be derived are critically evaluated, with a view to demonstrating how these benefits are not just applicable to these two parties, but also how they can be integrated as an improvement to the course of study as a whole.*

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## 1 Introduction and Historical background

Hairbrushes, historically, have always been generally single function. The idea of combining dual hair grooming functionality into one brush does not appear to have ever been considered commercially.

The flow chart shown in Figure 1 illustrates the development of the adjustable hairbrush idea from concept to acceptance by the manufacturer. Figure 2 illustrates the final design that was proposed and presented to industry. (See pages 99 and 100)

The idea stemmed from a first year industrial design assignment on hairbrushes and combs. Although not a requirement of the assignment, by combining the capabilities of two hairbrushes into one design, a unique concept was produced. Evaluation of this concept during marking of the assignment lead to the belief that it was worth taking further. It should be noted at this stage that the Intellectual Property Rights for the idea belong to, and remain with, the student as part of University policy in this area.

Having undertaken a patent search, and finding no other patents that appeared to be "prior art", the means of attempting to commercialise the idea were discussed, planned and put into motion.

From a financial perspective it was felt that the best option was to prepare and submit a patent application at a cost of £25 and then approach manufacturers with a view to granting an exclusive UK manufacturing licence.

The primary objective in this exercise was considered to be obtaining funding to take the patent application through to being granted (an approximate cost of £300).

The secondary objective was to try and obtain some form of remuneration in return for the granting of a manufacturing licence.

## 2 Patenting and Concept Development

It was felt essential to prepare a three dimensional CAD model of a functional representation of the idea. This was done using AutoCAD as, at this stage, the first year

students had only been introduced to two dimensional AutoCAD and preparation of a three dimensional model would build on this learning experience. (The Product Design students move onto three dimensional solid modelling in CADD5 during their second year). The hairbrush model was created over a period of two weeks as a joint effort. This was then usable for both the patent drawings and renderings for marketing the idea.

The subject of patents is covered during the first year and an assignment had already been completed to write a patent for a current household object, assuming that the student had just invented it and wanted to patent it.

Initially a draft patent application based on the proposed concept was prepared. After a number of modifications and agreed changes this was then submitted to the Patent Office.

At this stage the application was for a UK patent only with a view to, maybe, changing this to a more global PCT application during the twelve months period between filing and preliminary search, if it was felt that the potential existed for this to happen.

A review of the UK market and the manufacturers capable of both making and selling the product was then carried out. These requirements were quite limiting; the potential manufacturer had to have the following capabilities:

- able to manufacture the brush in reasonable volumes (circa. 30-50,000 p.a.)
- thermoplastic injection mouldings
- bristle both mouldings for the adjustable hairbrush (normally undertaken using a high capital cost bristle insertion machine - the bristles are mechanically inserted and retained by metal staples once inserted)
- assemble, package, market and sell the product in reasonable volumes (i.e. sell the product to at least one of the major high street pharmaceutical/beauty-care stores)

There are four known companies in the UK that correspond to this required profile.

A Confidentiality Agreement and Licensing Agreement were drafted and finalised. As part of the Licensing Agreement the aspect of royalties needed to be considered.

Reviewing the hairbrush market pricing at that time, a retail price of £3.99 was considered to be suitable. A figure of 6p (1.5% of this retail price) was arbitrarily decided on as being an acceptable target in terms of royalties for the idea.

At this stage the authors were not sure of what level of royalties would be acceptable, although a figure of 10%<sup>(1)</sup> of the retail price for a similarly innovative product had been reported (10% was certainly felt to be too high in this case).

### 3 Marketing the idea

A Marketing brochure for the product was prepared consisting of introductory text, CAD renderings of the solid model, the draft Licensing Agreement, the patent search results and a pricing strategy for the market.

One of the four possible manufacturing companies was selected as having a high potential for wanting the product based upon their relative size and current customer base (they were relatively large but with a wide, thinly spread range of products and customers, with market penetration into the major high street retailers). In addition to their UK manufacturing site they had a manufacturing site in the Pacific Rim, which would have been ideally situated to supply the potential Far East market.

The Confidentiality Agreement was forwarded and a date agreed for a formal presentation of the idea. It should, of course, be noted that as a result of this Agreement we are not at liberty to disclose the name of the Company concerned and they will hereinafter be referred to as Company "A".

In line with the Marketing work and presentations that had been undertaken as coursework previously, an audio visual presentation was conceived, prepared and presented to Company "A".

This was well received and was then put under consideration by the company. Deliberations continued over a period of five months, with numerous queries and Licensing Agreement amendments, whereupon a further meeting was called.

It was very apparent from this second meeting that very little work had actually been undertaken by Company “A” and an ultimatum was issued by ourselves for a decision on payment of, at least the patent costs, in order that Company “A” could retain its exclusivity in considering the product for potential manufacture. Company “A” declined to meet this deadline requirement.

The three remaining companies (“B”, “C” and “D”) were then contacted and presented with the idea. After further consultations with these companies over a period of four months a decision had been reached by all of them.

None of the companies was prepared to accept the idea with the royalty payments attached and time was now running out on the patent with only three months left to go before a decision to undertake the preliminary search was required. After much further deliberation it was decided to offer the licence on the basis of payment of patent costs only, with no royalty payments requirement. This was therefore in line with the primary requirement only.

The response this time was quite rapid. Somewhat surprisingly, companies “A”, “B” and “C” all declined this offer but Company “D” expressed a strong interest and confirmed that this would be acceptable to them.

At the time of writing, the patent has successfully undergone preliminary examination and is currently undergoing substantive examination. The idea will also be actively marketed by Company “D” (Albyn of Stonehaven Ltd) to potential high street retailers once this has been completed.

#### 4 The Learning Experience (Tutor)

Although the final outcome may not have been different, it is felt that a different approach would have exploited the commercial

potential of the idea to a greater extent. With hindsight it is felt that it would have been better to have approached a major high street retailer with a view to obtaining their endorsement of the product prior to approaching a manufacturer. This endorsement would merely take the form of recognition of a perceived need for the product, with no financial commitment to the inventor. By then taking the endorsed product to a manufacturer this would perhaps have given more incentive to take up the idea.

The limitations of this approach though would be twofold:

- The retailer would be likely to want exclusivity on selling the product.
- The retailer would probably be quite selective in their choice of potential manufacturer and the price they would want to buy the product at from that manufacturer.

The retail pricing within the hairbrush market is extremely competitive with manufacturing profit margins being severely constrained by the retailers. This meant that any royalty requirement based on numbers sold would not be well received. Although the primary objective of patent costs was met it became increasingly obvious with time that the royalty payment issue was a major stumbling block. If initially the idea had been made available in return for patent costs and a one-off negotiable lump sum payment this would possibly have generated some remuneration (although this does generally go against published recommendations)<sup>2 and 3</sup>. The tooling costs for the product have been estimated at around £40-50,000 and a figure in the order of 1-2% of this overall cost would seem likely to be a good starting point for negotiations in terms of a lump sum payment.

A common factor amongst all of the people who were shown the idea was that no-one was severely critical of it. Everyone who saw it was, to a lesser or greater extent, positive in their feelings towards its commercial potential as a retail item. The general reticence in wishing to take up the idea seemed to stem not only from financial reasons though, but also a general fear of breaking new ground and being

innovative. The UK hairbrush market has been quite stagnant over recent years with one of the Companies dealt with not having released a new (as opposed to a redesigned) hairbrush product for over eight years!

As time progressed this fear became more and more evident. It is felt that, if the product had been offered as “patent costs only” from the outset, Company “A” would almost certainly have bought it there and then, in contrast to their decision not to buy it on this basis at a later stage.

The major source of innovation in this market has been from Companies in the Far East. With some initial financial backing, and more time availability, it would almost certainly have been better to have directly approached Companies in the Far East. This, however, was not done as it was initially felt that Company “A” would be able to develop this sector of the market.

Overall, the strong reticence of British manufacturing industry to take up an idea which they all felt had some commercial viability was a grave disappointment. However this is in line with a number of other similar experiences of inventors, e.g. the Mumford vehicle anti-roll system which offers superior performance to anything currently available, but has not yet been taken up, despite significant manufacturing interest<sup>4</sup>.

### 5 The Learning Experience (Student)

This project obviously impinged upon academic work and a balance had to be maintained between academic workload and the requirements for patenting and marketing the idea. However, the comparison between what was observed in the commercial environment and what was taught in the academic one generated a number of valuable insights, namely:

- The need to rapidly develop three dimensional CAD skills in line with the industrial requirements for the solid model. (Interestingly, three of the Companies contacted were fairly “state of the art” concerning their CAD set up, one was still fairly traditional using drawing boards).
- Writing a patent application for an entirely new product proved to be considerably more demanding than the previous

assignment to write a patent for an existing, known product.

- The original presentation prepared for marketing the idea proved to have some weaknesses in it in terms of the description of the functionality of the hairbrush. It was soon realised that the abilities of Marketing personnel to comprehend rendered three dimensional images was generally not as good as might have been expected. The use of a normal vented hairbrush alongside the rendered images in describing the functionality helped to alleviate this. Ideally, a functional prototype would have been better but, at the time of presenting the idea this was not felt to be essential. The presentations and discussion meetings themselves, though daunting at first, proved to be less of a problem as time progressed.
- The general reluctance of British industry to take on board new ideas was the biggest disappointment with this project. To still be getting refusals even when the idea was being offered “at cost” proved to be a major disappointment.

The three real personal benefits that have come out of this work though, are:

- a patent with sole inventorship rights.
- a third year, high level industrial placement gained, in part, by shown and proven capabilities to undertake work in a commercial design and marketing environment.
- “real time” understanding of taught academic work in both design and marketing applied in a commercial context.

### 6 Benefits for the course

In terms of the tangible benefits that the pursuance of this idea has brought to the Product Design, Innovation and Marketing course, these can be summarised as follows:

- The interest and publicity that has been generated as a result of this project has made both current and potential students on the course aware of the fact that, by applying their combined design and marketing knowledge to a good concept idea, they can achieve some degree of commercial success.
- As a case study for both design and innovation subject areas this has generated

significant interest amongst the other students. Individuals are now coming forward much more frequently with new concept ideas and there are currently two more ideas ongoing which may have commercial potential.

In conclusion, and as an indicator of the quality of the student design work associated with this project, it is worth considering a quote from Hugh Smith, Managing Director of Albyn of Stonehaven Ltd <sup>5</sup>:

It was well thought out, well presented and worth pursuing. We know that retailers are always looking for exclusive products and new ideas and, if we can secure their interest, we would go ahead and produce it.

**References**

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- 2 The Scottish Office, Industry Department, *Help for the Innovator Series*, explanatory booklets.
- 3 The Patent Office, Registering licenses under your patent, explanatory leaflet.
- 4 Hales, Mark, Lonely struggle of the Great British Inventor, *Daily Telegraph*, Page C3, 3 February 1996.
- 5 Two heads are better than one, *Sphere* (in-house University of Derby newspaper), Page 1, Issue 6, February 1996.

**Fig. 1 Flow Chart showing the Processing of the Concept Idea for the Adjusta**

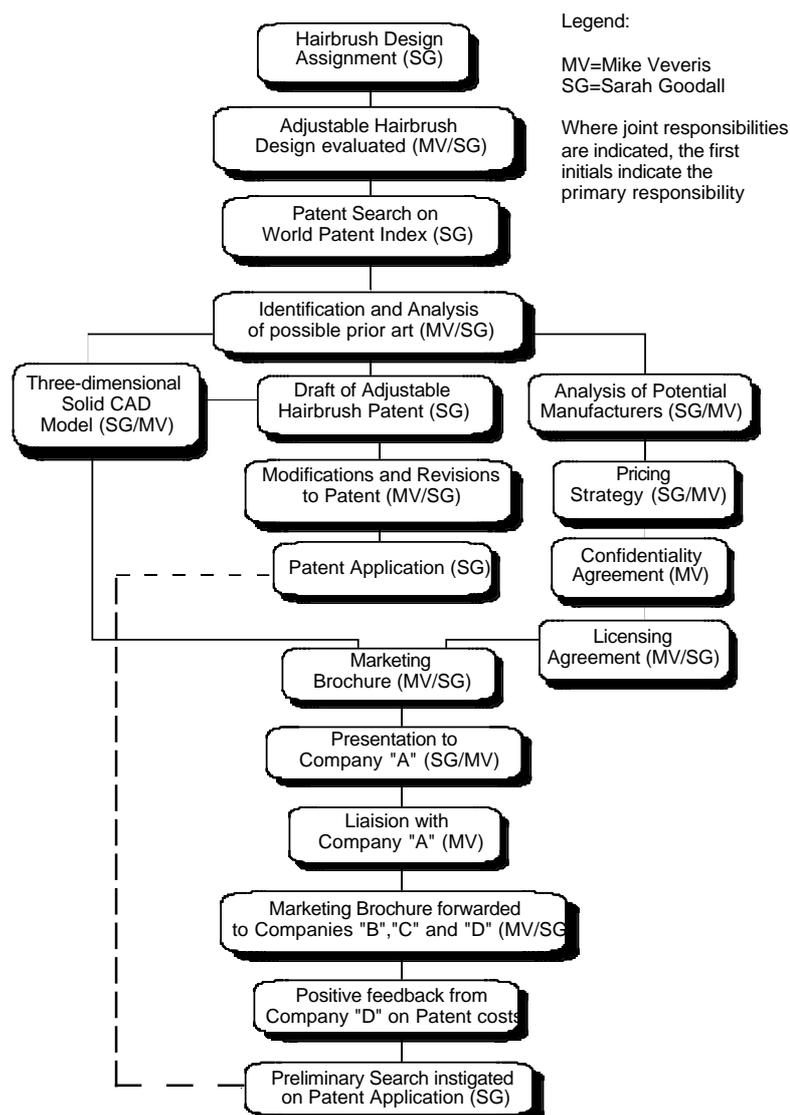
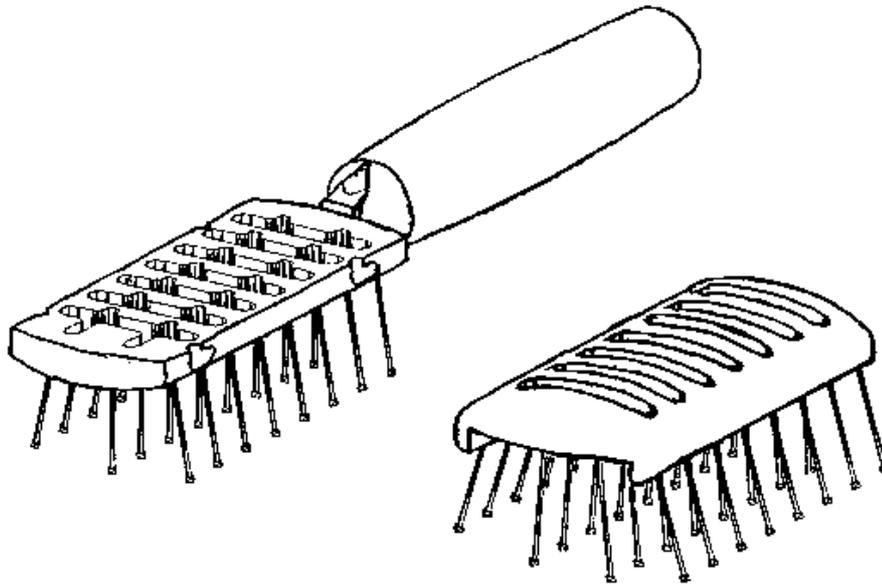


Figure 2



The Adjustable Hairbrush concept showing the Body moulding and the Saddle moulding. The Saddle clips onto the head and is then capable of limited movement to give either laterally aligned bristles or laterally misaligned bristles. This therefore gives an apparent bristle density difference when used in the two possible modes.