The Bersila Workstation: Stage one in a new work-furniture concept

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Introduction

'Bersila' means a form of a sitting position: on a cushion, a mat, carpet or rug, where the sitter bends the left leg and places that foot in front of abdomen, and then bends the right leg and place the right foot on top of the left foot so that the feet cross each other; it emphasizes core body strength because the position keeps the spine straight.

This research project focuses on developing a body of furniture that takes into account the typical Malaysian sitting position called '*bersila*' or the cross-legged position, which is common in most Asian cultures. The reason for thinking about furniture with this in mind is that the '*bersila*' position offers the most stability of any seated position, with three points touching the ground, creating a tripod effect.

Figure 1: '*Bersila'* siting position.

The cross-legged position involves both feet bent inwards and under the body, crossing each other at the ankles on the floor. The position is known in several European languages as tailor style, from the traditional working posture of tailors: compare tailor's bunion. It is also named after various plains-dwelling nomads: in English as Indian style; in many European languages "Turkish style", and in Japanese *agura*. The sitting style of non-Han ethnics (particularly Turks, Mongols and other Central Asians). In Yoga it is known as *sukhasana* and this position is called a half-lotus position. This position is common in yoga and meditation and it is also known as the basic position among yoga poses: it suits the beginner. Yoga teachers believe there are many physical and mental benefits of this pose.

As people become more aware of the benefits of yoga for themselves, they are beginning to bring these benefits to their children. According 'Yoga at School' (viewed 2011), today yoga for children is accepted and practiced in many schools across the UK and Australia. This is one of the significant contexts informing this particular research project.

In Malaysia, *Bersila* is particulary practiced in Malay village communities and *bersila* (sitting cross-leg) is common in many situations. For example meals are traditionally held on a floor; sitting cross-legged is also customary during the tea break while having a conversation, socializing or even while having refreshments or a meal and at other traditional events, this form of sitting position is considered gracious and well mannered in the Malay culture. The traditional Malaysian house has an open interior, promoting good cross ventilation and lighting and allowing the space to be used for many purposes depending on the season, occasion, or time of day. Since most activities take place on the floor, the need for furniture is minimal; bedding materials and sleeping mats are rolled up and stored during the day to eliminate the need for separate living and sleeping quarters.

This *bersila* practice, however, has gradually begun to change as the modern form of seating has been introduced into the home, the school and the business environment and a more western approach to seating has been adopted. Nevertheless, even though modern furniture is widely used in these situations, one will often find Malaysians and Indonesians sitting on chairs, for instance, in the *bersila* position. The objective of my research is to identify, explore, develop and design a combination of desk and chair, which applies the *bersila* concept.

Could this *bersila* concept be incorporated into functional furniture? Would the research findings discovered through applying this *bersila* concept create a new suite of furniture and forms that are suitable for the kindergarten education process and also a comfortable workspace for learning and socializing activities? Although the intention is to test the design's effective in Australia conditions, the principal aim of the research is to create designs that will be suitable for kindergarten children in Malaysia where the '*bersila*' seating position is adopted as a matter of course. Although this project considers the whole of class activities common in kindergarten, the focus of the design development has been on five learning

activities: reading, writing, arithmetic, and art, including drawing and colorings. Consideration has been given to the idea that this design will be the principal form of furniture in the classroom; it would mean that the typical table and chairs one sees in the classroom would not be necessary. One of the aims of the designs has been to come up with a workstation that is a base for each student, is easily stackable, compact and, at the same time, can be clustered in groups to provide a similar configuration to that which one might expect using conventional furniture.

Problem Identification

Many people assume the chair comes to represent a role and status. A chair can also come to stand for a whole person or to express that person's individuality (Galen, 2000). The concept of connections is intrinsic to design and nowhere more so than in the design of chairs. No other type of furniture offers the possibilities of making and facilitating connections in the same way or to the same extent. At the functional level, a chair makes physical and psychological connections for the individual sitting in the chair: it does this through its form and the use of materials. At the same time, it may embody meanings and values, which connect with the user at an intellectual, emotional, aesthetic, cultural and even spiritual level (FIELL, C. A. P. 2000, p.6).

The student's desk is often seen as the most important piece of furniture in the classroom. Because students work individually at their desks or rearrange them to form small groups or distinct seating arrangements, consideration has to be given to creating desks with portable drawers so that students can easily move about with their belongings (Butin, 2008). Designing a flexible body of furniture that takes into account these constraints will be a significant focus in this project.

In Western society, children use school furniture extensively during what is a vital period of human physical development. Storr-Paulsen and Aagaard-Hensen in Grenville (1999) noted that 8 and 9 year olds were expected to sit for more than sixty minutes in any ninety minute period, while Dillon observed that nursery school children were seated for 37.2% of their time in the classroom, while senior school pupils, aged thirteen to sixteen years, sat for 78.7% of the time. Since school-aged children might spend 30% of their waking hours at school, how children are seated in the classroom is extremely important and will vary from country to country and according to pedagogic fashion.

Mandal (1985) suggested that historically it is thought that an early school desk design by Staffel in 1884 has been very influential in the design of school furniture in the twentieth century. These early designs required pupils to sit up straight, and indeed this is consistent with the traditional stereotype of well-disciplined children. Although today it is recognized that

this upright seating position is infrequently adopted by children, it does appear that chairs and tables have been designed according to this standard position. Mandel also believed that the concept of correctly sitting upright with a hip angle at 90^0 was all wrong. Mandal (2003) emphasized a way of sitting where posture approached the spine's natural resting position, he called this balanced sitting. A hip angle 135^0 , or a forward seat pan tilt of $45^0 – 55^0$ from the horizontal creates the optimum balanced posture for the lower back. Indeed such a posture means that a backrest is no longer necessary.

According to Butin, the more flexible the classroom design, the better. He goes on to say:

> A classroom must be able to accommodate the changes in technology and teaching strategies for several decades to come. Movable furniture and storage spaces are just some of the factors that influence and expand how a classroom can be used (Butin 2008).

Most classrooms are dominated by the position of the chairs and tables: for example the introduction of a carpeted corner for children to sit, to carry out reading-based activities is a fairly recent innovation. Children's behavior has been shown to be affected by the layout of furniture. The way that chairs and tables are used in a classroom setting clearly has implications for the furniture's design and for the children's activities and education.

Another less often cited function of school furniture is to ensure that children stay in one place, in order to facilitate monitoring of their behavior and performance and to minimize distracting interactions. A further function of the furniture, then, should be to facilitate learning through providing a comfortable and stress-free workstation. This research project begins with this premise and with the view that *bersila* is the most comfortable and physically appropriate seating position.

Methodology

My first year of PhD Studies was taken up experimenting with design and with ergonomics, focusing on things such storage solutions, appropriate sizes and materials and thinking about new ways in which a student might sit on the chair or how this design will be used as a child's work station.

In the first phase of my design process, I listed all the criteria that should be in my design. In this stage, I was focusing on easy storage and a size that is suitable for children. The workstation also needs to be portable, ergonomic and safe. A lot of sketches were being done to get a good idea in these stages.

In the second phase, I'm focused on a new design concept and began to look at the form and at ways it which it might fold. I also began to investigate storage solutions with the idea that the workstation would be portable and that the kindergarten children would be able to take their possessions easily from one classroom configuration to another. During the concept development, I started with mock-ups and began thinking about new solutions derived from the pattern-making and arabesques of Islamic interior design and architecture that might be included in the overall design.

I then developed prototype 1 and 2 in the third phase to make sure about the proportions and ergonomic viability of the design. Some observation and experiment was done to determine the suitability of the function. However, the result was disappointing, as there were some weaknesses in both prototype 1 and 2. It seemed that the weakness related primarily to strength, for example in prototype 2, the holder for surface panel is not strong enough to hold the panel and in prototype 1, the weakness is in the seating area where the weight of the sitter may cause the join to break.

Figure 2: Prototype 1

In the fourth phase of the design process, sketches and mock-ups were developed once again to improve the design. After completing an assessment of Prototype 1 and 2, some elements and other functions were identified. For example in mock-up 4.1, I used the concept of LEGO toys to develop this idea and I also worked on a new concept and function for mock-up 4.2 that drew upon the developments of prototype 2. As a result I decided to choose mock-up 4.2 as my next design concept to be develop, because of the function and criteria

appeared more suited to this design. The positive aspects in this concept are that it has the storage compartment, a big space for the '*bersila*' position and it also has a folding writing surface panel. From this idea came experiments with difference solutions to the size of the hingeing in each of the mock-ups 4.2.1, 4.2.2, 4.2.3 and 4.2.4 to find the optimum mechanism.

In the next phase, I began developing the new prototype 3 by following the design from mock-up 4.4. The concept driving this design was to find the best way for the writing panel surface to fold inside the box when not in use and when in use, to insure its flexibility, strength and safety; I also began work on introducing a castor to make it easy to be move for storage. Unfortunately, the way this design works makes it is really complicated when one trys to fold the writing surface panel into the box, there were 6 steps to fold the writing surface panel into the box or pull it out from the box. As a result I began developing the next design by creating a new prototype. Some changes were made in the new prototype no 4 and I removed the writing panel from inside to outside of the box. The result was a success and it become easier to fold in or to pull out the writing surface panel. In the prototype 4, I also moved the castor position at the bottom of the object but that became a new problem in this design, because the prototype would shake when the children using it. However it was only minor problem with this design (prototype 4): the major problem for both prototypes (3 and 4) was about the material. I was using the MDF to create my entire prototype and it is too heavy to be used and easily moved by children.

To attempt to overcome the problems in prototype 3 and 4, I have given some consideration to using other material and 'Gaboon' is the best solution at this stages. Gaboon is kind of marine plywood and lighter than MDF board and 25% lighter than other plywood. I selected a 15mm Gaboon as my core material to create the next prototype. I have created a new design (prototype 5) with this material to see how it works and in order to reduce the size of the object. As a result of developing this prototype, I found that it was much better in use gaboon as the core material. Children find it more comfortable to handle prototype 5 compared to prototype 3 and 4 they can easily lift and move the furniture, pull out the writing surface panel to install as their workstation.

In comparison with other prototypes, prototype 5 uses a drawer for the storage compartment. In this design, the user can choose either 'Bersila' sitting position or a normal 'Western' sitting position so there is flexibility in using this furniture. Only two castors have been used for this prototype however it still easy to move. There were some problems with the writing panel holder and writing surface panel in the previous prototype (3 and 4) because it was too dangerous when the children install and reinstall the panel I still hadn't been able to resolve the issue of children possibly catching their fingers between holder and panel but in this design I decided to create a space between the writing holder panel and the writing surface panel. With this solution children can safely pull the writing panel in or out by using that area

created by the gap as a handle. After doing some experiments and discussion, I defined and then began to work on the continuing problem of the strength aspect of the hingeing in writing panel holder for prototype 5.

Next I had to produce a prototype 6 for improving the existing weaknesses in prototype 5, and I am very satisfied with the design of prototype 6. The early mock-ups and prototype were cut manually but by the time I commenced prototype 6, I was able to make use of a MULTICAM CNC routing machine: I designed the specifications so as to allow all of the components of the workstation to be cut from a single sheet of plywood and it immediately meant that I was able to produce the prototype more quickly and economically.

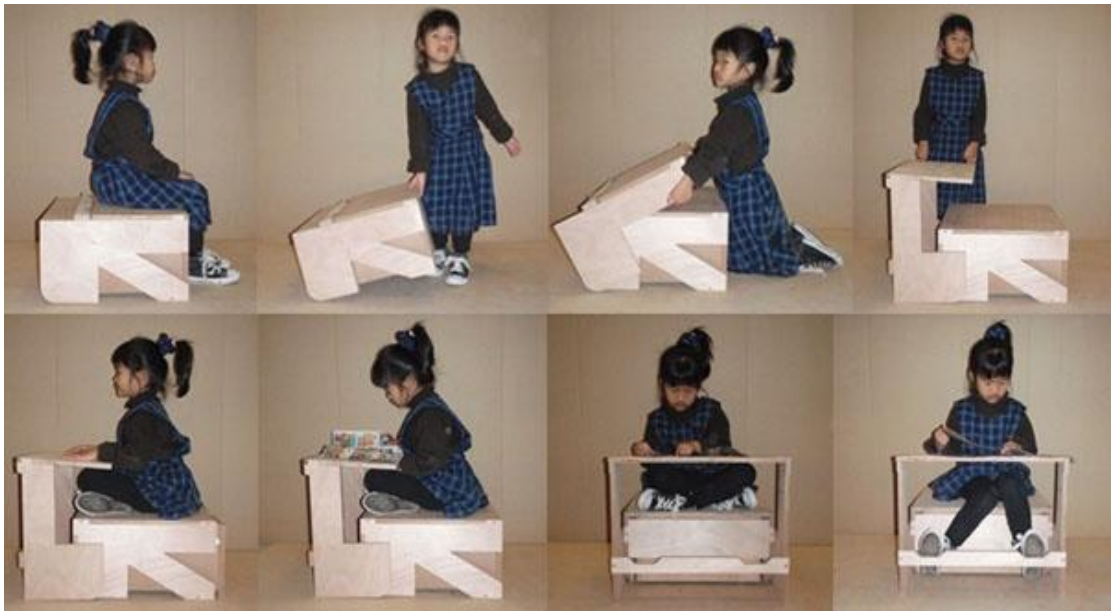

Figure 3: Prototype 6

At this point I decided to create a prototype 7 for exhibition so that I could get responses from other people about the concept. After discussion I decided to put a varnish on prototype 7 to emphasise the original effect of Gaboon. His prototype was exhibited at the Plimsoll Gallery, Hobart late in 2010 in ‘Seeing Double’ and subsequently in Malaysia when the exhibition toured to Perak.

Figure 4: Exhibited at Plimsoll Gallery.

Prototype testing

During my second years I have produced the prototype 7 with 1 set of 4 units in different colour, I selected red, green, yellow and blue. To further my research studies, I needed to obtain feedback in order to ascertain the weaknesses in the latest prototype that been developed. I was thinking to get the responses from my target user so at this point I decided to carry out observations in a selected kindergarten in Malaysia. I prepared 4 workstations and 20 kindergarten students took turns using the prototype in the kindergarten class over a period of 3 days. Results from the observations have shown that the prototype is working well and is easily used by students. I also got excellent good feedback from the teachers and I have discovered that when students began working with the prototype they explored other possible functions of the prototype – it became a toy, a dais, and even another type of stool or chair when set on its edge.

Figure 5: Children with the prototype

Figure 6: Children explored with the prototype

Conclusion

The research studies in Malaysia have lead me to start to develop a new range of furniture objects that will be different but will extend my work to the next level of primary education – again with the same concept of *Bersila*. This is because; I want to explore the possibility that suitable inexpensive and flexible furniture incorporating the *Bersila* concept can be applied at all levels in the Malaysia education system.

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