MASTERS DEGREE IN FASHION DESIGN

THE EFFICIENCY OF METHODS USED FOR TEACHING AND LEARNING PATTERNMAKING:

A Comparative Analysis

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.

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DEDICATED TO:

My grandmother, Ana Teresa Carrasco, for teaching me to embroider and to make clothes since I was 12 years old! Watching you make clothes was always so fascinating!

And to those that not only have a passion for Patternmaking, but also for teaching it!

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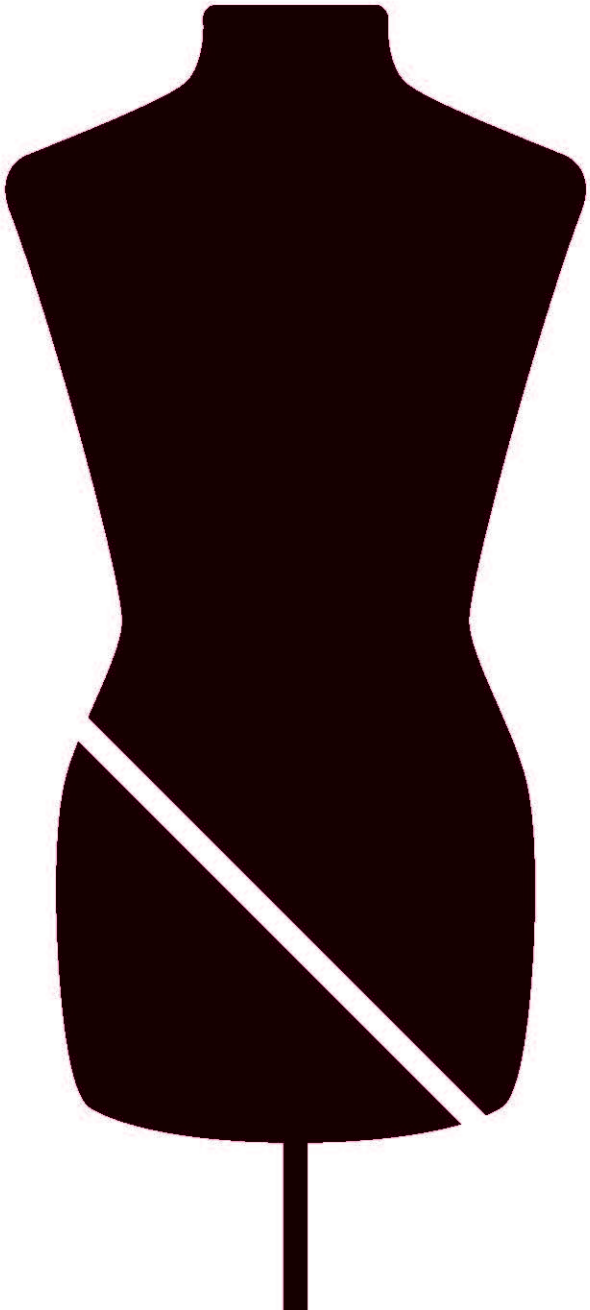
And my students, for all your love and support!

"FASHION
IS ARCHITECTURE.
IT IS A MATTER
OF PROPORTIONS"

CHANEL (W.D. APUD FISCHER 2009, P.11)



Abstract.

The focus of this research in Fashion Design is the methods of teaching and learning pattern making. The purpose is to study and observe a few current methods and draw conclusions on their efficiency from the results obtained by the students.

Combining non interventionist and interventionist approaches the qualitative research hereby proposed uses tools like (1) literature review, (2) observation of first level patternmaking classes (so as to describe and classify the methods used by the educators according to the students' learning proficiency), and (3) interviews to students and educators (to identify their backgrounds and experiences as well as the variables that contribute for the efficiency or deficiencies of the observed methods).

The conducted interviews and observation provide first hand information and are therefore of great importance in this study. Also relevant is the selection and review of literature, as it was a permanent source of information.

This research is a documented study of three cases (one in Lisbon, Portugal and two in Mumbai, India.) on the methods that are being used for teaching and learning pattern making and concludes by evaluating their efficiency.

KEY WORDS:

- Fashion Design
- Patternmaking
- Teaching
- Learning
- Education

Resumo.

O foco desta pesquisa de design de moda são os métodos de ensino e a aprendizagem de "patternmaking". O propósito é estudar e observar alguns métodos correntes de ensino e retirar conclusões em termos de eficácia através dos resultados obtidos pelos alunos.

A combinação de abordagens com intervenção ou sem intervenção de pesquisa qualitativa aqui proposta utilizará ferramentas como: (1) pesquisa literária (2) observação de aulas de "pattern making" de primeiro nível (para descrever e classificar os métodos de ensino usados pelos docentes de acordo com os resultados do desempenho dos alunos) e (3) entrevistas a estudantes e docentes (para identificar os seus antecedentes e experiências bem como as variáveis que contribuem para eficiência e deficiências identificadas nos processos de ensino).

As entrevistas e observação conduzida vão permitir adquirir informação em tempo real, e como tal são de grande importância para este estudo. Igualmente relevante será a seleção e análise de literatura e documentação, que será um recurso permanente de informação.

Esta pesquisa é um estudo documentado de três casos (um em Lisboa, Portugal e dois em Mumbai, na India) sobre métodos utilizados para o ensino e aprendizagem de pattern making, e retira as suas conclusões avaliando a sua eficiência.

PALAVRAS-CHAVE:

- Design de Moda
- Patternmaking
- Ensinar
- Aprender
- Educação

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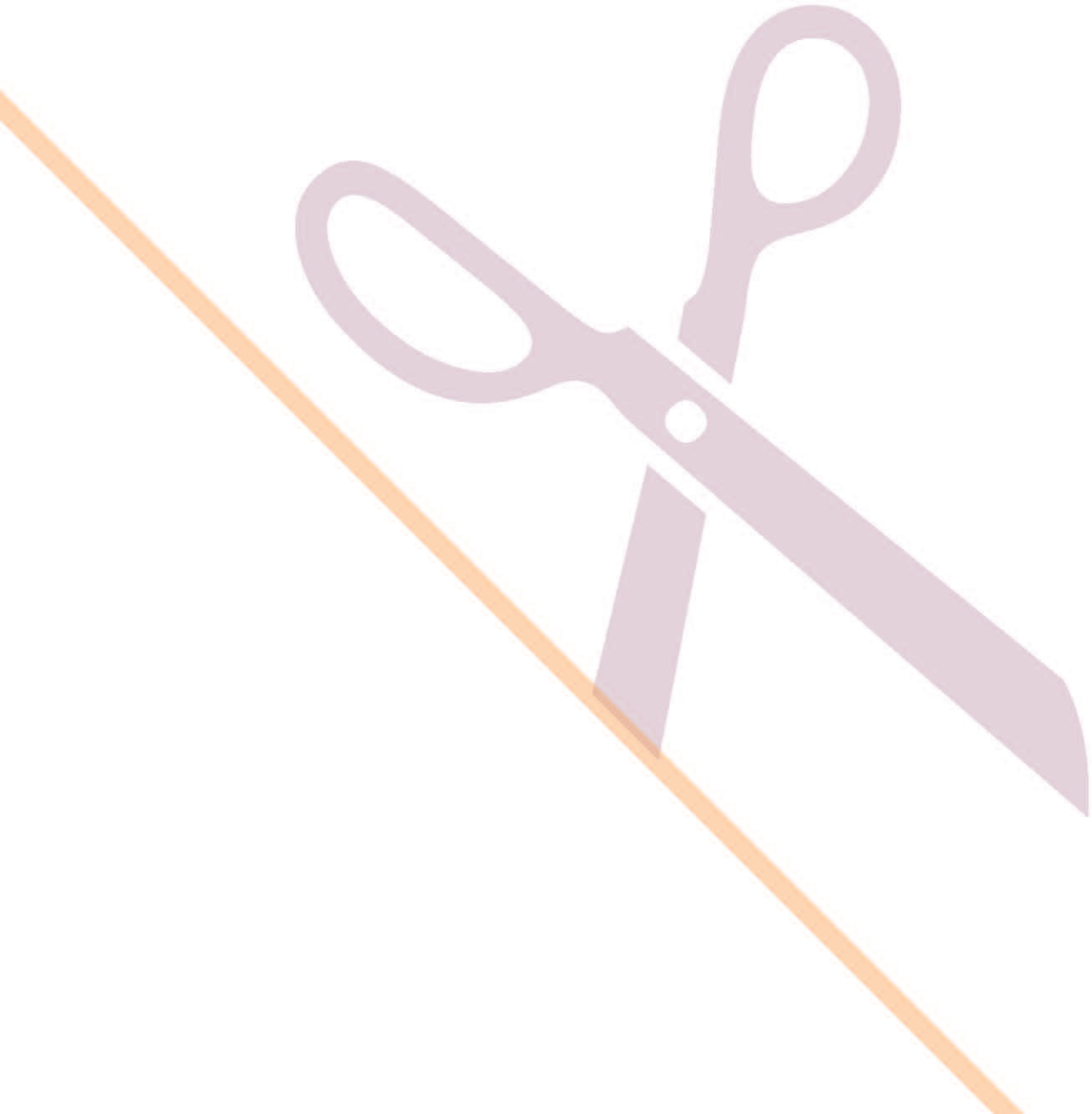


1| Introduction

"I use the same approach to clothes as I did when I designed buildings. It is basic geometry: you take a flat form and revolve it in space"
Ferre (w.d. apud FISCHER, 2009, p.25)

This research is focused on understanding the methods used for teaching and learning patternmaking in some colleges as well as professional courses and to evaluate their efficiency. It involves studying common methods of teaching this subject in the form of literature review, the study of cases through observation and interviews and drawing conclusions on the efficiency of the observed methods based on the results of the students being taught. The observations of patternmaking classes were held in Lisbon, Portugal (one case) and Mumbai, India (two cases) and students and teachers from these classes were interviewed. While drawing conclusions, care was taken to be aware of all variables such as the class size, teacher's experience, class hours, etc.

This is an investigation using a non-interventionist methodology and of qualitative character. Its tools comprise literature review, as well as case studies based on observations and interviews .

Patternmaking is an important part of fashion design, and it is important that designers understand and keep in mind the construction of garments and their details while designing them. Even if the designers are not putting the garments together, they need to be able to explain the details to the patternmaker in order to avoid misunderstandings.

"Construction is the foundation of clothing and of fashion design; it is vital that fashion designers know and understand the techniques involved in creating a 3-dimensional garment from a 2-dimensional design or pattern in order to create a beautiful shape and fit on a moving body."
(FISCHER, 2009: 7).

As said above by Fisher (2009: 7), it is patternmaking that makes it possible to turn a flat sketch into a garment, its shape given by the joined pieces of fabric cut from the fabric. Patternmaking is thus one of the main techniques that ensure us the look of the final garment.

Taking all this relevance into consideration, the training of the patternmaker is therefore important and requires training and practice. Patternmakers need to develop an eye for measurement and should be able to imagine what a line on the pattern will look like on a three-dimensional body. This study, therefore, aims to observe three methods of teaching/learning patternmaking in order to identify which is closest to being an easier, faster, interesting and efficient method to train students in this subject.

By studying and observing and then comparing the methods we can understand the ability of the students to grasp information, to work out the variables and draw conclusions based on their results. By doing that it is expected that the

amount of students that not only understand but enjoy this subject may increase.

The main theme of this research is based on the methods of teaching and learning patternmaking for fashion designers with the key words being:
Fashion Design, Patternmaking, Teaching, Learning and Education.

Patternmaking is one of the most important parts of Fashion Design. It is an art that needs to be mastered and good patternmakers are greatly appreciated. It involves working with measurements taken from a three-dimensional form (the human body) on a two-dimensional surface (paper or fabric) to produce a garment that is three-dimensional. Patternmaking is one of the first processes towards constructing a garment and only after the pattern is made can the pieces be cut out in fabric and sewn together. Taking its importance into consideration, the education of patternmaking for Fashion Design students requires training and practice. This process requires one to be precise and because of the calculations and numbers involved, it seems complicated. Many educators of patternmaking notice the lack of interest of their students in this subject. For these reasons, three cases were studied, observing teachers and students in selected patternmaking classes and the base of this research and question was defined as : How effective are the methods used by the educators while teaching patternmaking? In order to carry out the research, the following areas had to be investigated:

-What is patternmaking?
- Why is it important for fashion design students to learn patternmaking?
- What are the common methods used in teaching?
- What are the methods students learn from? Is it the same as that learned by the educator or one he/she has modified to better suit the students' way of learning or accepting information ?

The general objective of this research is to understand the efficiency of the methods used while teaching and learning patternmaking, as it is an area of great importance in the construction of garments. In order to address the objectives it is necessary to:

- Study existing methods of teaching and learning patternmaking.
- Observe patternmaking classes in progress to identify methods adopted by the educator and the performance of students
- Speak to students that are learning this subject, finding out their difficulties and opinions on the subject.
- Speak to patternmaking educators and find out the difficulties they face while teaching this subject and their experiences and options.

Through this study, we understand the efficiency of the methods used to teach and learn pattern making by observing the methods used by a selected set of educators teaching patternmaking and working out the variables to draw conclusions. The hypothesis is defined as the teaching/learning methods based on hands-on approaches are more efficient than those solely based on replicating the information passed on by lectures.

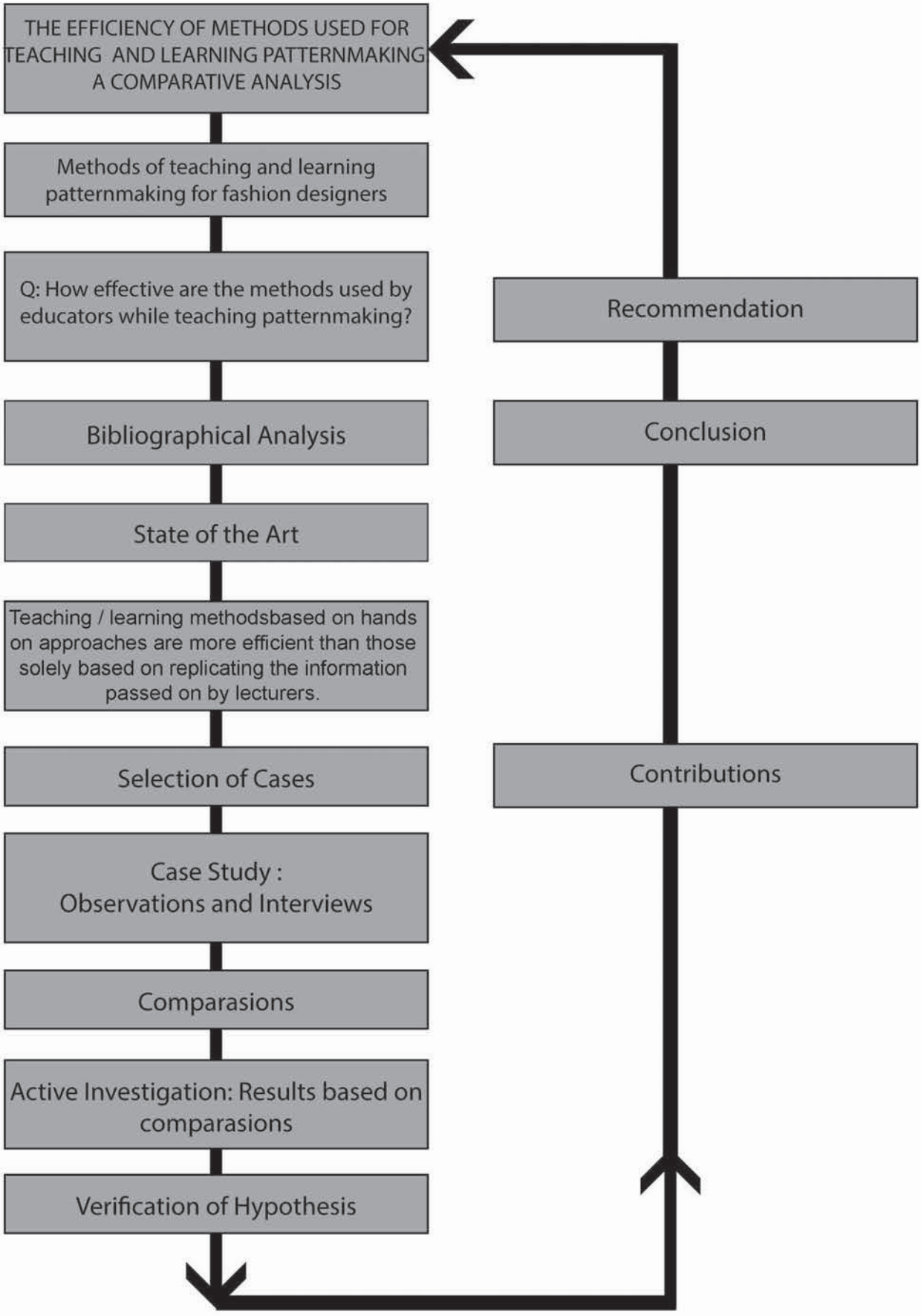


Figure 1 - Organogram describing the process of the thesis. (Author, 2016)

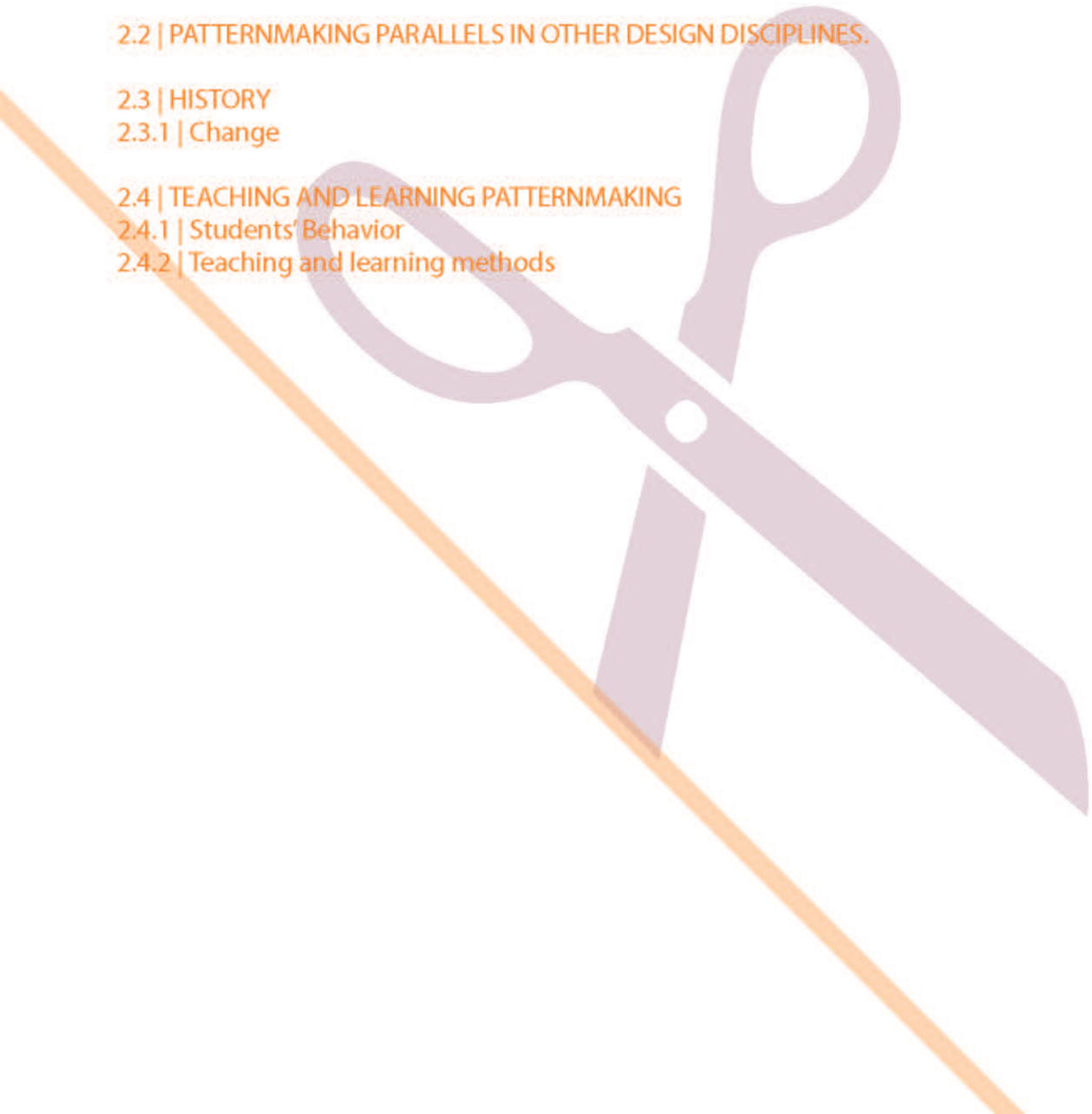
The diagram (Figure 1) explains the process of the thesis where after defining the title and theme of the study, we study what patternmaking is, its history and importance, along with existing methods of teaching and learning and the behavior of students all included in the State of the Art. After selecting the cases for this study, observations and interviews were conducted and comparisons were made and based on these, the results and conclusions were drawn.

After establishing the investigative question, specific keywords were defined to help with searching and selecting relevant information from books, publications, journals, etc. With this information, studies and reviews were carried out to complete the State of the Art, followed by the hypothesis

After the hypothesis was defined, the case studies were carried out by observing the teaching methods of a set of selected lecturers and students and interviewing them. On noting the observations, teaching methods and interview responses were compared and the conclusions drawn based on the students' ability to put to use what they had learnt in class.
This thesis is divided into 7 chapters.

Chapter 1 is an introduction to the thesis and it gives the reader an idea of what this thesis contains, explaining the objective and aim of the thesis along with a brief outline of the processes involved. Chapter 2 is the literature review, the State of the Art where we see what Patternmaking is along with its importance and its history. We also learn of the methods used in teaching and learning in general and those used in patternmaking along with the behavior of students. This chapter prepares us for Chapter 3 which is where a detailed description of each case under observation can be found along with the comparisons of the students' interviews and teachers' interviews and the overall observations. The conclusions based on the observations and interviews are found in Chapter 4, where we learn which method is the most efficient. Finally we have the Bibliography and Bibliographical References which consist of the books , articles, papers, websites and thesis' used as reference and the Appendix which contains notes and photographs, interview questions and responses that were collected during the case studies. The cases for this research were chosen based on convenience with regards to semester timing, language used while teaching, availability of the institutions to participate and accessibility. These were convenience samples in a qualitative research which, according to http://research-methodology.net, is also known as availability sampling that "relies on data collection from population members who are conveniently available to participate in study."

2 | State Of The Art



2 | STATE OF THE ART

2.1 | WHAT IS PATTERNMAKING?

According to Rosen (2004: 2), patternmaking is "the link between design and productions, which turns a designer's sketch into a 3-dimensional functional garment" and is possibly one of the most "highly developed technical skill, requiring precision in the drafting and development process. It also necessitates an understanding of the body and its proportions and measurements". According to Treptow (in BEDUSCHI, ITALIANO, 2011: 1), "pattern making for fashion design is the same as engineering is to architecture." As technical and precise it may be, there is no specific "right and wrong" method, and therefore it gives freedom to the patternmaker to modify existing methods to suit his/her needs.

> "The creation of a garment is comprised of interdependent yet disparate processes. The appearance and fit of a garment is highly dependent on each process. Patternmaking is one of the earliest steps in the development of a garment. It is a craft that has evolved over the centuries into a skilled technical process."
>
> McDonald (in ANDERSON, 2005: 1)

According to Almond (2010: 1), "Pattern cutting is essentially a series of body measurements that ultimately creates a three dimensional shape that fits a human body." McDonald (in ANDERSON, 2005: 1) tells us that in the late medieval ages, since weaving was a very laborious task carried out manually on primitive looms, fabric was a much desired and valued product. Garments were constructed using the entire rectangular piece of fabric without cutting into it, thus there was minimal, if not no fabric wastage. Towards the fifteenth century, patternmaking began to be used to make more fitted garments, cutting into the fabric to have pieces that could be sewn together to make garments adapt to the shape of the body. Patternmaking was a highly respected skill and tailors worked carefully with clients' measurements to make customized patterns, something only the rich could afford. After the Industrial Revolution, however, there was a need for patterns to be standardized in order to make ready-to-wear garments a success.

Patternmaking helps bring the designers' sketch to life and is one of the first and most important steps towards the construction of a garment. It gives shape and dimension to an idea. "It is important for designers to understand as early as possible how a garment grows from a 2-dimensional concept into a 3-dimensional object" (FISCHER, 2009: 11).

> Without the patternmaking domain the sketch turns vain and the fashion design a scribble. The patternmaking is like the structure of a building [it] is the intelligence of designing, the wisdom of making.
>
> Beduschi and Italiano (apud NAKAO, 2009)

It is not enough to design a garment without understanding how it is going to be made. A garment needs to be designed with its construction in mind. "In order to create well-made garments, it is essential that the designer fully understands the techniques used in order to make pattern cutting as straightforward and accurate as possible" (FISCHER, 2009: 20). Kinsella's observation of today's designers is sadly something we can agree on: "the term 'designer' seems to be more and more a fluid name given to anyone with a bright idea, rather than the skills and technical expertise needed to execute it" (KINSELLA, 2012: 1). Kinsella states that the job of a patternmaker "may not be as glamorous as the glossy world of the fashion designer, but pattern cutters are an essential part of the design process" (KINSELLA, 2012, p.1). She further goes on to describe the patternmakers as people that work in the shadows of these celebrity-like designers to make their sketches a reality. The patternmaker is basically a translator or an interpreter who often has to make sense of the illustrations or ideas of the designer, figuring out the details and style lines of these ideas (KINSELLA, 2012).

There are various processes of patternmaking and patterns can be created using two-dimensional or three-dimensional processes; many times, patternmakers use a combination of processes to make a finalized pattern. Flat patternmaking is the most common 2D method where a more complex pattern is made from a basic block or sloper that have no seams or style lines. From these basic blocks, patterns for numerous garments can be created. Design features and style lines can be added to these along with different details such as pockets, gathers and even more volume. This method is more commonly used in the ready-to-wear industry since it is faster

and accurate (ANDERSON, 2005). According to Almond (2010: 1) flat patternmaking is the most traditional and can be taught to students "through scale or the direct measure system" which involves creating a block that fits the human form and adapting and manipulating it to create the pattern pieces from which the fabric can be cut and sewn together. Campbell (2014: 3) describes flat patternmaking "as a method of creating patterns for garments from technical drawings" where a set of body measurements are applied to a garments design from which a manual or digital pattern is created and later, a garment that fits the body is produced. It is more accurate and effective when practiced by experienced patternmakers and is usually favoured because of its price and production process.

Draping or moulage is a three-dimensional process of patternmaking and is said to be the oldest method. This process involves molding, pinning and cutting fabric on a mannequin, details and style lines are added on the pieces of fabric and once they are taken off the mannequin, they are laid over paper and traced onto it. This process is helpful when one is working with tricky fabrics or elaborate or intricate styles of garments (Anderson, 2005).

> "Draping does not rely on the aid of a pattern to create designs, although a draper may choose to incorporate part(s) of an existing pattern in the preparation of the muslin (cloth) to assist in the drape. It is also true that those using the flat patternmaking method may incorporate some aspects of draping in creating a specific design. This does not minimize the value of either patternmaking method, but it does enhance the patternmaker's ability to create design patterns accurately and within time constraints"
>
> Almond (apud Joseph-Armstrong 2008, vii)

Three dimensional patternmaking can be "unpredictable, time consuming and costly, often using more fabric than the two dimensional process" (Camplell, 2014: 3)

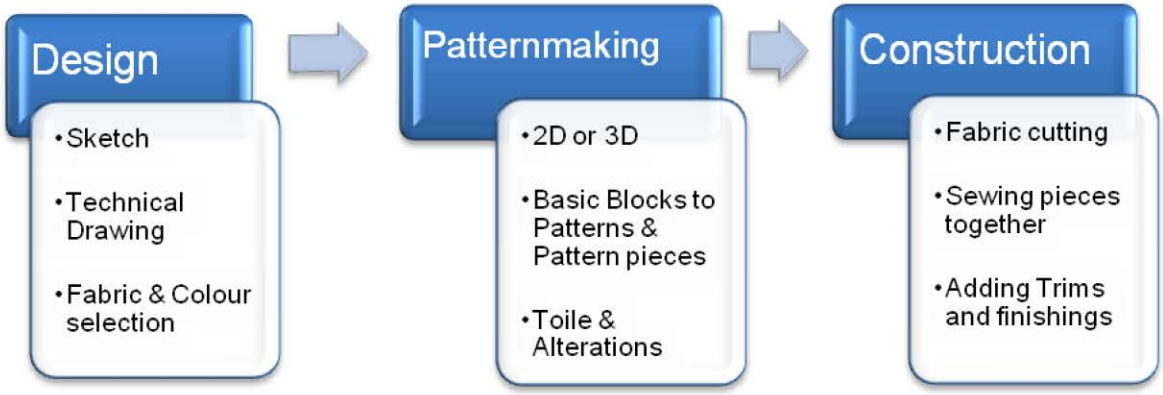


Figure 1 – Diagram representing the process involved in producing a finished garment. (Author, 2016)

2.1.1 | Importance of Patternmaking and Patternmakers

According to McQuillan, Rissanen and Roberts (2013: 46), patternmaking is often seen to be "an aloof, mathematical and often dry practice, certainly not very design or even 'creative', and very inaccessible and as stated by Almond (2010: 16) it is often introduced as a very technical and mathematical subject that is very complex but instead what is really needed is "awareness of experience, self-reliance and manipulation of concepts as a link to creativity."

Grässer (2011) states that the media portrays fashion as a glamourous and vibrant industry where the designers are the stars and often the technical side of fashion is left out of the reports, videos and photos. As a result, very often, many students who join fashion courses have not been exposed to and may not have heard of the technical side-patternmaking and garment construction and do not take these subjects into account. Almond (2010) also confirms this when he states that "It is rare to discover a fashion student who really wants to pursue a career in pattern cutting

unless their particular course has emphasized this" (Almond, 2010: 2). He goes on to say that the role of patternmakers are not highlighted like that of the designers' and media promotes glamour and hype of designing and styling but fails to throw much light of patternmakers who are "the backbone of every collection" (Almond, 2010: 2). As rightfully said by Karimzadeh (in Almond, 2010: 2), "Most designers require pattern cutters to make sometimes impossible seeming creative ideas take shape" designers require patternmakers to turn their ideas into reality. Thierry (in Almond, 2010: 2) confirms this when he says, "Without a creative pattern cutter the design just doesn't work so it's an integral part, (...) unless the two are together, creativity will not exist." The main purpose of a patternmaker, is to make a garment's pattern by interpreting the designer's sketch. There is usually minimum or no verbal communication between the designer and the patternmaker and a good patternmaker can make patterns that require a few or no corrections (Kim, Takatera, Otani, 2014)

The patternmaker is part of the production team and is usually hidden from public attention, he/she usually works hidden away from public interest to help realize the designer's vision. Often, patternmakers work in different buildings and sometimes even different countries than the designers, interpreting detailed sketches sent by the designer or the design team (McQuillan, Rissanen, Roberts, 2013) and according to Romano (in McQuillan, Rissanen, Roberts, 2013: 40), "before you buy a garment and wear it, it will have been touched by many skillful hands, but often the hand that touches it the LEAST is the hand of the fashion designer."

> "The industry maintains a strict veil of glamour around the notion of what a designer is and does, often ignoring the many hands that go into the production of clothing. Contributing to this, students are often encouraged to view themselves as creative geniuses with visions of a career as fashion designers."
>
> (McQuillan, Rissanen, Roberts, 2013: 39)

Originally, fashion students were taught to design a garment, make patterns and toiles for it and then the final garment, but with the expansion of fashion education and its diversification over the past twenty years, courses like Fashion marketing, styling and illustration have been added, taking much attention away from the technical importance of garment construction. There have been many attempts to promote patternmaking by the industry and in education, one such attempt is that by

The British Fashion Council with the introduction of the 'Student Creative Pattern Cutting Award' in 1996 and a film titled 'Innovative Pattern Cutting' in 2000 hoping to glamorize this field and to help students realize that there is a huge demand and job opportunities for those that have patternmaking skills. Colleges in the UK like London College of Fashion and Central St. Martins offer Post Graduate courses in Creative Pattern Cutting for the Industry, which is designed to provide students with the required skills in this technical field and to help them understand the creative process of interpreting a design in the womenswear market. This course teaches them advanced patternmaking and manufacturing techniques which increases their creativity in solving design problems which helps them get jobs with well known designers, retailers or even to set up their own business (Almond, 2010: 3).

There are different processes to develop a garment and each play a great role in the fit and appearance of the finished garment. Patternmaking is the foundation of making a garment and it plays a very important role in determining how accurate the fit and appearance are (OBINNIM , PONGO, 2015).

According to Obinnim and Pongo, a big part of a country's total revenue is contributed by the garment industry and consumers are becoming demanding when it comes to styles and fit. Patternmaking is a skilled technical process that has greatly improved over the centuries and with the extensive research and standardizing of sizes, it has taken the revolutionary step from customization to standardization. Knowledge in patternmaking and the ability to draft patterns are skills that can improve the quality of garments. They also go on to say that "Effective and efficient use of flat patterns in dressmaking can help save time, energy and fabric that comes with freehand cutting and thereby increase productivity and save on costs"

> "Patternmaking is an art. It is the art of manipulating and shaping a flat piece of fabric to conform to one or more curves of the human figure. It is a bridge function between design and production"
>
> (OBINNIM , PONGO, 2015: 1850).

2.1.2 | The Art of Patternmaking

In her PhD thesis, Simões (2012), proposes that patterns be looked at as artwork instead of mere functional or technical artifacts or objects as there is a sense of skill in depicting the body accurately through pattern pieces and in order to state that they fit into a "visual representation" category, it is important to realize that "patterns correspond to diagrams of the body" and that they are "more than 'faithful' depictions of the body (…) for the reason that they also portray the knowledge the designers have about the body" (Simões, 2012: 4,5). She further explains that by stating that patterns are an art or possess beauty, means that, unlike most art, "their beauty doesn't lie in the way their lines are drawn – in terms of the quality of their brushstrokes, but in the way their lines are arranged – in terms of what they represent" (Simões, 2012: 8) and that patterns are not beautiful or artistic because of how unique their maker's sketches are, but instead in the "artistry" to depict a form or an object that is three dimensional onto a surface that is two dimensional.

> "To look at patterns is, then, more than seeing shapes – indicating the type and style of garments they will turn into – for the reason that patterns dare us to perceive the body within them. This awareness is attained through the clues left by their maker, which allow us to imagine where the patterns' lines divide the space of the body and how the patterns' flat area is distributed around the body. Just then, by acknowledging the correspondence created between the sketch and the body, we become conscious of the patterns' beauty."
>
> (Simões, 2012: 12)

According to Bohm (in Simões, 2012: 13), it takes more than knowledge about the body to take pleasure in seeing a pattern and it also needs one to understand the concept behind constructing the pattern in order to realize that "all [its] parts [are] generated naturally from simple principles, and with these parts working together to form a unified total structure," which means that the beholder understands the complex lines, measurements and understanding involved in the construction of the pattern.

According to Hulme (in Simões, 2012: 4), the act of drawing patterns needs a different mental approach as basic patterns need a "sound knowledge of the human form" while garment patterns need "good draftsmanship, a sense of line" and as a result, it is assumed that in order to draft a basic block or pattern one should have a

"scientific attitude" but for garment patterns an "artistic talent" is needed. According to Debo (in Simões, 2012: 8) "every pattern carries within it the potential garment and, therefore, the potential body" which tells that beside their value in producing garments, patterns are a representation of the body, whose understanding increased with the development of other areas such as "mathematics, anatomy and anthropometrics" and helped, in turn, the patternmakers to develop more accurate patterns. In the nineteenth century, the significance of patterns was looked at as an "accomplishment of an accumulated knowledge" or as the "materialization of an enhanced awareness" (Simões, 2012: 5).

> "… the theory of pattern design is built on the identification of **(1)** the body's key landmarks – acting as the points from which the draft is organized –, and **(2)** the body's key measurements – converted into algorithms settling the distances between the sketch's lines –, which respectively decide **(1a)** the clothing's equilibrium on the body throughout movement, and **(2a)** the relationship between the size of the body and the garment's scale. But in the end, the theory of pattern design goes beyond the establishment of **(1)** the exact spacing between the patterns lines – making possible that seams rest on the joints of the body –, **(2)** the correct direction of the patterns lines – making possible that the seams separate the front and back, the left and right sides of the body –, and **(3)** the quantitative correlation between the lines of the different pattern pieces – making possible that a neat and smooth appearance is conferred to the potential garment."
>
> (Simões, 2012: 14).

2.2 | PATTERNMAKING PARALLELS IN OTHER DESIGN DISCIPLINES.

Imagining for a moment that one has no inside knowledge in Fashion design and specifically in pattern making - how do you explain what it is, how can this process be described?

It is not straight forward technical drawing, it is more than that. It seems to be, in simple terms, the way in which you create parts to assemble a complete piece, and in most cases that translates into a garment. This process has obvious parallels to other fields of design, to architecture, and to an extend to engineering. The process of deconstructing a design to guarantee that the final result is the one expected. The use of the term deconstruction (as in an inverse process) is purposely chosen, because of how the design process occurs. The designer imagines a whole product, envisions a final look, and the pattern making process is one of reversion, of

how the parts come together to achieve that desired outcome.

Fashion design and pattern making in particular tackle a very specific issue - the fact that in fashion most garments are made in sizes, which generates the need for a controlled scaling process of the manufactured pieces. This is something that hardly ever happens in design, apart from garments and shoes there are only few other examples of objects manufactured in scaled sizes to fit various configurations. For this reason pattern making takes a very special role in the manufacturing process.

Going far back in history we can establish that when a shift from single handcrafted goods to more organized manufacturing processes occurred, there came a need to create an accurate representation system - the basis for the system already existed, earlier used for construction, architecture, sculpture - From a more archaic form in Roman times to some sort of process resembling what is currently done which started in Italian Renaissance.

“From 1400 to 1600, technical drawing began emerging. Filippo Brunelleschi began incorporating linear perspective in his paintings about 1425, which gave his successors the ability to depict mechanical devices for the first time in a realistic manner.” (http://www.ehow.com/facts_5833077_early-history-technical-drawing.html)

“Technical drawing can be traced as far back as the 3rd millennium BC to Babylon, where archaeological digs exhumed rudimentary drawing implements and designs. The process became formalized during the Italian Renaissance when Filippo Brunelleschi completed sketches of famous Florentine landmarks drawn perfectly to scale. Since the 18th century, specific disciplines of technical drawing have developed, and during the 20th century, these became aided by the use of computers.” (http://www.ehow.com/facts_5042740_definition-technical-drawing.html)

That process of creating objects, garments, furniture pieces and an infinite number of things that would be repeated and should somehow obey a certain design - whether in small series or in large scale. That process where due to profit and rationalization the material used should be optimized. That process where the number of operations and the assembly should be as simple and as effective as possible. All this created the need for a coded form of representation, understood by whoever was producing something somewhere. Technical drawings were created with that in mind, enabling that the information necessary for the visualization of something was compiled and understood through a defined representation and

agreed codes. The roots of technical drawing come from architecture and from construction processes in general. Pattern making enables that with similar data, but with an increased level of information there is a process - not of representation - but of construction. It is like that in Fashion Design, as it is in other disciplines, where this enhanced and function specific type of drawings are used to build, construct and manufacture a very wide array of things.

- "Technical drawing, drafting or draughting, is the act and discipline of composing drawings that visually communicate how something functions or is to be constructed. Technical drawing is essential for communicating ideas in industry and engineering. To make the drawings easier to understand, people use familiar symbols, perspectives, units of measurement, notation systems, visual styles, and page layout. Together, such conventions constitute a visual language, and help to ensure that the drawing is unambiguous and relatively easy to understand. These drafting conventions are condensed into internationally accepted standards and specifications that transcend the barrier of language making technical drawings a universal means of communicating complex mechanical concepts.
- This need for precise communication in the preparation of a functional document distinguishes technical drawing from the expressive drawing of the visual arts. Artistic drawings are subjectively interpreted; their meanings are multiply determined. Technical drawings are understood to have one intended meaning.
- A drafter, draftsperson, or draughtsman is a person who makes a drawing (technical or expressive). A professional drafter who makes technical drawings is sometimes called a drafting technician. Professional drafting is a desirable and necessary function in the design and manufacture of complex mechanical components and machines. Professional draftspersons bridge the gap between engineers and manufacturers, and contribute experience and technical expertise to the design process."

(Technical drawing definition from Wikipedia)

Visual representation in Product design

The design process in product design, no matter what you are designing, has a very strong tridimensional component, it is often said that a product designer must

imagine things in 3D - perception of space. Be as it may, the translation of ideas into paper occurs both in two dimensional and tridimensional form. When sketching the tridimensional element is present in a non-accurate way, to create the perception and the rendition of the desired outcome. But because there is a very strong obsession with data, measurements, precision, two dimensional drawings are extremely useful to create one sided views that combined form the overall object. In the traditional process of the discipline a model would always be necessary, to somehow confirm in real life the accuracy of what was defined in paper, scale models, real size models - paper, clay, cardboard, wood, foam, high density foam, polystyrene - whatever is suitable to construct a model that allows us to test ergonomic interaction, assemble parts integration, visual impact, aesthetics - all of the above rely on physical models to be guaranteed.

"Orthographic projection (or orthogonal projection) is a means of representing a tridimensional object in two dimensions. It is a form of parallel projection where all the projection lines are orthogonal to the projection plane, resulting in every plane of the scene appearing in affine transformation on the viewing surface. A lens providing an orthographic projection is known as an (object space) telecentric lenses.
The term orthographic is also sometimes reserved specifically for depictions of objects where the axis or plane of the object is also parallel with the projection plane,as in multi view orthographic projections."

Orthographic representation can be found in "Biological data visualization, Chemical imaging, Crime mapping, Data visualization, Educational visualization, Flow visualization, Geovisualization Information visualization, Mathematical visualization, Medical imaging, Molecular graphics, Product visualization, scientific visualization, Software visualization, Technical drawing, User interface design, Visual culture, Volume visualization."
(Orthographic projection definition from Wikipedia)

Considering that product design as a discipline was born with the industrial revolution hundreds of years ago, Computer generated models represent a great revolution in this field - it is only in the past two to three decades that virtual tridimensional tools have been around, to allow product designers to create computer generated models before going to the task of a physical model - even though sometimes a simple paper model is a very useful shortcut. The interesting thing is

that in product design there is nothing compared to pattern making - in terms of definition. The process is there, it is obviously necessary and depending on the materials it can be quite complex - to the point that the intervention of a engineer is necessary.

“Today, the mechanics of the drafting task have largely been automated and accelerated through the use of computer-aided design systems (CAD).

There are two types of computer-aided design systems used for the production of technical drawings" two dimensions ("2D") and three dimensions ("3D").

2D CAD systems such as AutoCAD or MicroStation replace the paper drawing discipline. The lines, circles, arcs and curves are created within the software. It is down to the technical drawing skill of the user to produce the drawing. There is still much scope for error in the drawing when producing first and third angle orthographic projections, auxiliary projections and cross sections. A 2D CAD system is merely an electronic drawing board. Its greatest strength over direct to paper technical drawing is in the making of revisions. Whereas in a conventional hand drawn technical drawing, if a mistake is found, or a modification is required, a new drawing must be made from scratch, the 2D CAD system allows a copy of the original to be modified, saving considerable time. 2D CAD systems can be used to create plans for large projects such as buildings and aircraft but provide no way to check the various components will fit together.

3D CAD system (such as KeyCreator, Autodesk Inventor, or SolidWorks) first produces the geometry of the part; the technical drawing comes from user defined views of that geometry. Any orthographic, projected or sectioned view is created by the software. There is no scope for error in the production of these views. The main scope for error comes in setting the parameter of first or third angle projection, and displaying the relevant symbol on the technical drawing. 3D CAD allows individual parts to be assembled together to represent the final product. Buildings, Aircraft, ships, and cars are modeled, assembled, and checked in 3D before technical drawings are released for manufacture.

Both 2D and 3D CAD systems can be used to produce technical drawings for any discipline. The various disciplines (electrical, electronic, pneumatic, hydraulic, etc.) have industry recognized symbols to represent common components.

BS and ISO produce standards to show recommended practices but it is up to individuals to produce the drawings. There is no definitive standard for layout or style.

The only standard across engineering workshop drawings is in the creation of orthographic projections and cross section views.

Drafting can represent two dimensions ("2D") and three dimensions ("3D") although the representation itself is always created in 2D (cf. Architectural model). Drafting is the integral communication of technical or engineering drawings and is the industrial arts sub-discipline that underlies all involved technical endeavors.
In representing complex, three-dimensional objects in two-dimensional drawings, the objects can be described by at least one view plus material thickness note, 2, 3 or as many views and sections that are required to show all features of object."
(Computer aided drafting/design definition from wikipedia)

Using two extreme examples in the same design discipline - product design - we can understand how the process that is somehow parallel to fashion design pattern making is established in product design.

Example 1 - In woodwork construction processes for furniture design, the drawings supplied for construction/manufacturing should have information on all the parts necessary, each and every part dimension and then the technical detail on how parts are connected - They can for instance be glued together, joined by hardware parts, pinned together with nails or screws, but in most situations they would actually use the traditional technique of wood joints (the connections between parts) since these are often structural and give a piece extra levels of rigidity, resistance and durability. There are a wide number of wood joints and wood cutting techniques that are recommended for specific situations. Many of these processes and techniques are not exclusive to designers, they are a legacy from woodworkers, artisans and craftsman that developed these techniques way before any form of systemic design was identified. So technical drawings will have dimensions and some idea of how the parts are divided to form the overall object - but furthermore information is included in something that we can call construction drawings - in those drawings all the assembly details, part connection, joining techniques are detailed and represented.

In traditional carpentry there is a process called pattern making, where die casts are created to reproduce the same part repeatedly.

Example 2 - On the opposite end of the scale - technologically speaking - in plastic

molding techniques there is also something more detailed than technical drawings, the mold drawings. These drawings include a level of information that allow the person that is making the mold how to construct it with precision - The mold is the tool necessary to manufacture plastic parts, components or even full objects. The mold is manufactured in a complex industrial process and it is carved out of a block of any metal alloy, the level of precision is extremely high depending on the intended part dimension. The mold drawings need to consider how the part is extracted from the mold - exit angles and tolerances. In some cases the mold has moving parts to allow the part to be extracted - this increases the complexity of the mold, increases the cost, and the maintenance requirements during the mold expected life (molds have a limited number of parts they are able to produce, depending on the material quality and maintenance operations). The complexity of this process is very demanding and for that reason mold drawings are very complete and accurate. They explain even how the mold functions once the material enters the mold to create the part - the flow of the material before it solidifies into the final polymer (plastic). With the mold drawings we have a document that allows us to create a part (like a negative somehow) and that drawing is complementary to the technical drawing to the part itself. Designers are very often not able to do the mold drawings themselves - they are created by mold specialists or engineers.

Even though the pattern making name is not used in this particular example, molds are used to create parts the same way that blocks are used in fashion design to generate garment parts.

Technical drawing in Graphic design

Once we shift to graphic design there are plenty of parallels with the pattern making process, packaging and paper constructed shapes require a preparation in terms of planification, a sort of pattern making for paper, cardboard or polymer sheets.

The need for protecting, storing, displaying and transporting goods developed a necessary part of the finished product - packaging. It adds value to the purchasing experience, it encases product, accessories and manuals, it allows for transport before and after purchase. All these functions at minimal cost, because people are ultimately paying for what is inside, and the box very often is waste soon after it is

opened. Packaging is much more than just boxes, but for this parallel comparison with the pattern making process it makes sense if we limit it to foldable packaging: cardboard, paper or thin plastic sheets. They are designed in a two dimensional plan and then mounted through a series of folding actions and locking mechanisms that secure shape and rigidity. Designing these "boxes" is a challenge, taking into consideration the outside printing, the information required, the cost control, the weight, protection of content, overall presentation, transport and all this combined as the visible face of the product when it is in a shelve. All things considered the process of design and assembling of the die cut of a box has some relation with pattern making. Folding, thickness margin consideration, material resistance. Some more developed examples of boxes and die cuts are inspired in the traditional yet creative art of Origami. "Origami is the art of paper folding, which is often associated with Japanese culture (Origami definition from Wikipedia).

2.3 | HISTORY

> "The first dressmakers' drafting system was created in the United States before 1838. This innovation provided a tool to draft stylish, fitted garments and appealed to women who were forced to make their own clothes. (...) A wide variety of changing economic, social and technological factors determined the methods that were created at specific times, how the systems were sold and who used them"
>
> (KIDWELL, 1979, iv)

Kidwell describes drafting systems as "a significant technological and economic breakthrough. They reduced the amount of time and skill required to cut a fashionable garment that fit well" (KIDWELL, 1979: 1). Drafting systems kept improving with time and not only helped tailors and dressmakers, but also made it easier and more affordable for women to make garments for themselves and their families at home.

According to Kidwell (1979), as garments became more elaborate greater skill was required. Pattern making, or "cutting" was the mental process of determining the shape of the pieces as well as the physical act of cutting them Kidwell (apud

Johnson, 1807: 73) states that in order to be a good pattern cutter, one's "hand and head must go together". Laws defined the distinction between tailors and seamstresses, stating that the tailors were "skilled workers who cut the more complicated garments" (KIDWELL 1979).

As the tape measure was not invented yet, tailors measured customers with strips of parchment and recorded dimensions by cutting notches in the strip (KIDWELL 1979). Patterns were very valuable and they were often referred to as "gods" and were kept secret and passed down for generations.

2.3.1 | Change

The fashionable cut of men's clothing evolved slowly through the 18th century, changing feature by feature to a narrower, more fitted proportion. By early 19th century they were fitted, almost sculptured. Forms were created more by the cut than the fall of the fabric. "A gentleman's figure was a product of his tailor's art rather than his parents' genes" (KIDWELL, 1979, p.6).

This required skill, precision and experience. Tailors began to find the traditional methods inadequate for these changing trends. Since the 18th century was the "Age of Enlightenment" where "men regarded experience and reason as more important than divine revelation" (KIDWELL, 1979, p.6), it meant that observation, experimentation and problem solving were encouraged and one did not have to blindly follow traditional methods. They could be modified and improved and even done away with. Everything was changing and with the creeping in of the industrial revolution at the end of the century, everything was changing and evolving. There was an increase in fashionable garments and not everyone could afford the made-to-order traditional method garments. Tailors faced the problem of having to keep up with the latest styles that were closer fitted and more precise and constantly changing and there was now added pressure of the quantity of orders as well as the demand for cheaper prices. This made them open to ideas and possibilities of new,

easier and faster methods. These eventually encouraged the creation and use of the tape measure.

Another reason behind the change of methods and techniques depended on who was now using them. In the beginning it was tailors that developed these methods for their use in their professional field. Later, almost half way through the 19th century, methods were modified to help inexperienced women cut their own garments as well as those that wanted to work with patterns professionally.

2.4 | TEACHING AND LEARNING PATTERNMAKING

Pattern making has changed and developed tremendously since the 19th century in terms of practicality and efficiency and can be categorized into three types: "manual flat patternmaking, computerized patternmaking and three-dimensional patternmaking." (BEDUSCHI, ITALIANO, 2013: 49). Manual flat patternmaking is one of the most common and practical methods to develop patterns. Computerized/digital patternmaking is done with the help of computer-aided tools and is commonly used in large garment production factories. The three-dimensional technique, commonly known as draping, involves placing manually and "molding" the fabric over a dress form (BEDUSCHI, ITALIANO, 2013).

Patternmaking helps realize a design or an idea into a garment. Taking the importance and relevance of this skill into consideration, the training of a patternmaker is very important and requires specific training in this area. "It is important for designers to understand as early as possible how a garment grows from a two-dimensional concept into a three-dimensional object" (FISCHER, 2009: 11). Having started off as study with findings and improvements kept a secret and only handed down through the family or to apprentices, patternmaking has eventually changed into an area that needs to be promoted while studying Fashion Design in colleges.

> In response to industry demand for highly skilled and talented technical expertise, more fashion design colleges are offering qualifications in the technical elements of fashion manufacturing, with degrees and postgraduate diplomas in creative pattern cutting leading the way.
>
> (KINSELLA, 2012)

There has been much change in not just patternmaking methods, the fashion industry and education, but also in the behavior of students in the past thirty years but teaching methods have yet to keep up with these changes. Educators mostly use the methods of teaching that they were taught by and very few modify their methods. (ASHDOWN, 2013)

2.4.1 | Students' Behavior

The students of today are also known as the "Millennial Generation" or "Generation Y" and are those that are born between 1982 and 2003. They have also been called a new "Great Generation" These students display ambition, confidence, optimism and a high – level cooperative work. These students are also known to have a high rate of conventionality and over-reliance on parents. They are idealists and are powerfully shaped by their parents' reaction to the laxness of the Sixties and Seventies. Up till the Seventies, having children seemed problematic and irresponsible for many couples, there was a change of mind after that and there was now a newfound love for children. This generation is sheltered and fussed over more than those before (WILSON, GERBER , 2008). Millennials are known to work well as a team and are said to be skilled when it comes to collaborative effort and, according to Strauss and Howe (in WILSON, GERBER , 2008: 31) "Millennials are developing strong team instincts and tighter peer bonds." These young adults are said to have big plans about their careers and respond best to external motivators while carefully thinking about the future, their degrees, jobs and salaries. They are also said to have a "work hard, play hard" attitude. This is most probably because they are often raised by parents who are workaholics in an economy that requires highly skilled labour and they realize that they must build up a strong resume, fast. They are said to feel a greater amount of stress than their parents did at the same age. (WILSON,

GERBER, 2008). According to Strauss and Howe (in WILSON, GERBER, 2008: 34) students are "pushed to study hard, avoid personal risks and take full advantage of collective opportunities adults are offering them, Millennials feel a 'trophy kid' pressure" (WILSON, GERBER, 2008). They also state that since Millennials are high-achievers, they are greatly interested in their grades and want to know their grades throughout the semester and request frequent feedback in most aspects of their lives.

Simões and Silva (2016) state that Portuguese millennials have similar traits to those of the American millennials discussed so far. They have observed the behavior and expectations of their students and noted that these are visibly different from the generations before them, which call for new methods of teaching to help them learn better. They state that while these students have similarities with millennials in other countries, they are dependent on their parents, both emotionally and economically and their parents feel the need to protect their children from harsh social factors such a "the excess of graduates, the lack of employment opportunities, the short-term employment practices, etc" (Simões and Silva, 2016: 5). These millennials are 'protected' till their 30s and even longer and as a result do not feel the pressure to move away from their parents' home. They usually feel the need to study as much as possible and earn several degrees, at the expense of their parents. Millennials are also not well prepared as students as most of them do not "read or attend any art shows and performing arts events, except fro pop and electronic music festivals (…) Social media dominates their lives" (Simões and Silva, 2016: 6). The research information these students collect is mainly found online using Google or Pinterest rather than by reading books or watching documentaries. One of the attempts the authors implemented to help their students to learn was the introduction of collaborative learning so that the students "understand more easily the importance of working together toward a common goal" (Simões and Silva, 2016: 6). The authors further state that although collaborative learning is more strenuous for the lecturers since they have to organize the teams and see that there is equal participation by all members, the outcome is worthwhile as it is " a way to counter the obsessive virtual connectedness millennials have and to develop their creative and technical skills" (Simões and Silva, 2016: 8).

According to Fernandez (2015), the Indian millennials are “the best-educated generation in independent India and most likely to drive the country to long-term prosperity.” Like the Portuguese millennials, the Indian millennials also are in no rush to leave home and prefer to live with their family, the main reason being the change in their views on marriage (it is traditional, in Indian society, to live with your parents till you get married and the concept of moving out of the house while you are in the same state or city is not heard of or well accepted). In a survey conducted in 2015, it was found that 80% of the Indian millennials that were interviewed, aim for the top and want to be leaders and have a management position at work. Although some prefer to work for businesses that are already established, many have an “entrepreneurial streak” and want to start a business of their own. Most millennials believe that they can achieve more out of India and that in order to have a better career it is necessary to work abroad. Bhattacharya (2016), states in his article in The Wall Street Journal that “India’s millennials put in more hours at work than their peers from the rest of the world” which, based on the ManpowerGroup survey “of 19,000 millennials in 25 countries, Indians came out on top, clocking a massive 52 hours per week on average.” He also states that in developing economies like China, India and Mexico, Indian millennials were more positive about getting jobs (similar to those in more developed countries like U.S.A, Germany and Switzerland). According to the Millennial Survey of 2016 conducted by Deloitte, while searching for jobs, millennials in India look for chances to progress and to take on leadership roles (apart from a reasonable or good salary) and most measure the success of a business not just by its financial status, but mostly by having “satisfied and loyal customer base” and a high level of innovation. According to Reetu (2016), Indian millennials can be described as “ambitious and risk takers”, looking to grow professionally (which is more important to them than job stability) through experiences and challenging jobs. They are interested in higher education and are also competitive and feel the need to prove that they are not less than those from more developed countries.

Changes occur in all areas, and the behavior of students is also affected by changes around them and these in turn, create changes in areas related to them. Students today belong to a technological world and as a result they work at a different pace, have different expectations, focus and skills than the students before

them. These students naturally learn better with methods modified to fit their generation. Methods today need to project patternmaking as a subject that provides skill and has the value they need for their goals and it needs to be portrayed as an exciting and creative subject (ASHDOWN, 2013). Ashdown further goes on to say that the teaching methods do not match the expectation of students and students do not want to be lectured to.

> Those born at the turn of the twenty-first century, (...) are predicted to be skillful multitaskers, will use the internet as an 'external brain', and be conditioned to expect instant response to their needs and quick fixes to their problems. If current attitudes continue they will be perceived as lacking patience and deep thinking ability that will impede their ability to learn.
> (ASHDOWN, 2013: 113)

According to Davis (2000) (in CLIMER, 2013: 102), "When students work beneath their potential then they tend to develop a negative, dismissive attitude about the value of the subject and its relevance." First time drafting students often seem impatient and many do not understand the importance of patternmaking. They find the subject irrelevant and slow and beneath their design capabilities. This frustration with having to leak the basics suggests that there is a failure in the system of teaching this important subject. "They can sketch and imagine far more interesting clothing than a pencil skirt in toile or a bodice block" (CLIMER, 2013: 102).

2.4.2 | Teaching and learning methods

In their study, Wilson and Gerber (2008: 32) encourage educators to "strive for greater clarity in course structure, assignments and grading expectations." They suggest that educators submit course syllabi and pacing guides at the beginning of each semester.

> "Collaborative Learning capitalizes on the energizing *confidence* displayed by Millennials, seeing them as accomplished, self-starting, and creative. (...) Again, traditional "fountain-and-sponge" pedagogies (teacher: fountain, student: sponge) are rarely appropriate when one is dealing with 'the Next Great Generation'"
>
> (Wilson, Gerber, 2008: 32)

According to Sweeney (in WILSON, GERBER, 2008: 33), "Millennials expect a much greater array of product and service selectivity" since they have grown up with a huge variety of choices and feel like it is something that they deserve to be given. In their survey of 71 millennial students, Wilson and Gerber (2008: 34) found that these students preferred to work in teams than to work alone. However, they suggest that students should be put into smaller groups of two to three to avoid "free-riders" or team members that do not contribute to the project.

Wilson and Gerber state that "'Teach less' is a controversial maxim, but also one with a long history in pedagogical theory and practice" (WILSON, GERBER, 2008: 35). They understand that the reason for this is because a lot of undergraduate programs used to aim at "providing a sequential mastery of 'basic knowledge' in order to make upper-level courses truly advanced, decreasing content was pretty much unthinkable" (WILSON, GERBER, 2008: 35). They also state that many educators feel that 'content-mastery' is not as important as thoughtful processing and critical analysis. They further state that "smaller packages of material, especially when parsed in break-out sessions, make for more engaged students and deeper discussions" (WILSON, GERBER , 2008: 35).

In his study, Climer (2013) discusses the possibilities of a collaborative method of learning, where, instead of working individually, students work in groups and claims that very often students work near each other but not with each other. "Working in the classroom is often more productive than working alone because it allows for group exchange and collaborative learning" (CLIMER, 2013: 101). Since everyone is working on similar projects, it is helpful to work in a group as group members communicate with each other casually and share their experiences and methods of doing a certain task. Students tend to learn faster from each other's mistakes and even from their positive experiences.

Ashdown (2013) suggests ideas for new teaching methods that will help students to not only understand patternmaking and develop skills, but to also enjoy the learning process. She suggests visual teaching, which involves having images that speak for themselves. We already understand that students do not have much patience with lengthy traditional methods they see in books or other books made up mostly of text. Instead she suggests showing them a series of powerful images on each topic of discussion or telling the students to collect patternmaking related images that catch their attention. This helps them to look at garments from their construction point of view and students can compare images and ideas amongst the class. The same can be done with videos.

A conceptual method is also suggested, where the student has a better chance to understand shape and how to achieve it. This is a more hands-on method and the students learn by trying out shapes and details themselves rather than having only the educator's word. This way, students learn from their experiences and can figure out how to give a flat surface shape with the use of darts, pleats, tucks, etc. They learn to think about seams and notches, shifting darts, adding or taking away volume, etc. They also learn from their classmate's mistakes and success. Factory visits are also suggested. Since one of the biggest challenges is convincing students about the importance of the skills they need, in a garment production factory, the students are able to see each skill taught in their course being put to use on a daily basis.

Giving students the freedom to explore different methods of patternmaking helps them find what they are comfortable with. Ashdown (2013) suggests teaching a set number of basic skills, then asking the students to design a garment and create it using these basics (learning new skills as needed). She suggests that a runway (or college hallway) show of the garments can be a good way to motivate them to spend more time or put in more effort.

> Whatever happens in the future, our task as teachers is not to 'download' a set curriculum of information to students, but to understand, engage and guide our students to their future. Understanding this will keep our attention and our efforts focused on the needs of the students as they change.
> (ASHDOWN, 2013: 119)

When it comes to learning, students are found to benefit better from Experiential Learning. According to Kolb and Kolb (2008: 1), "the experiential

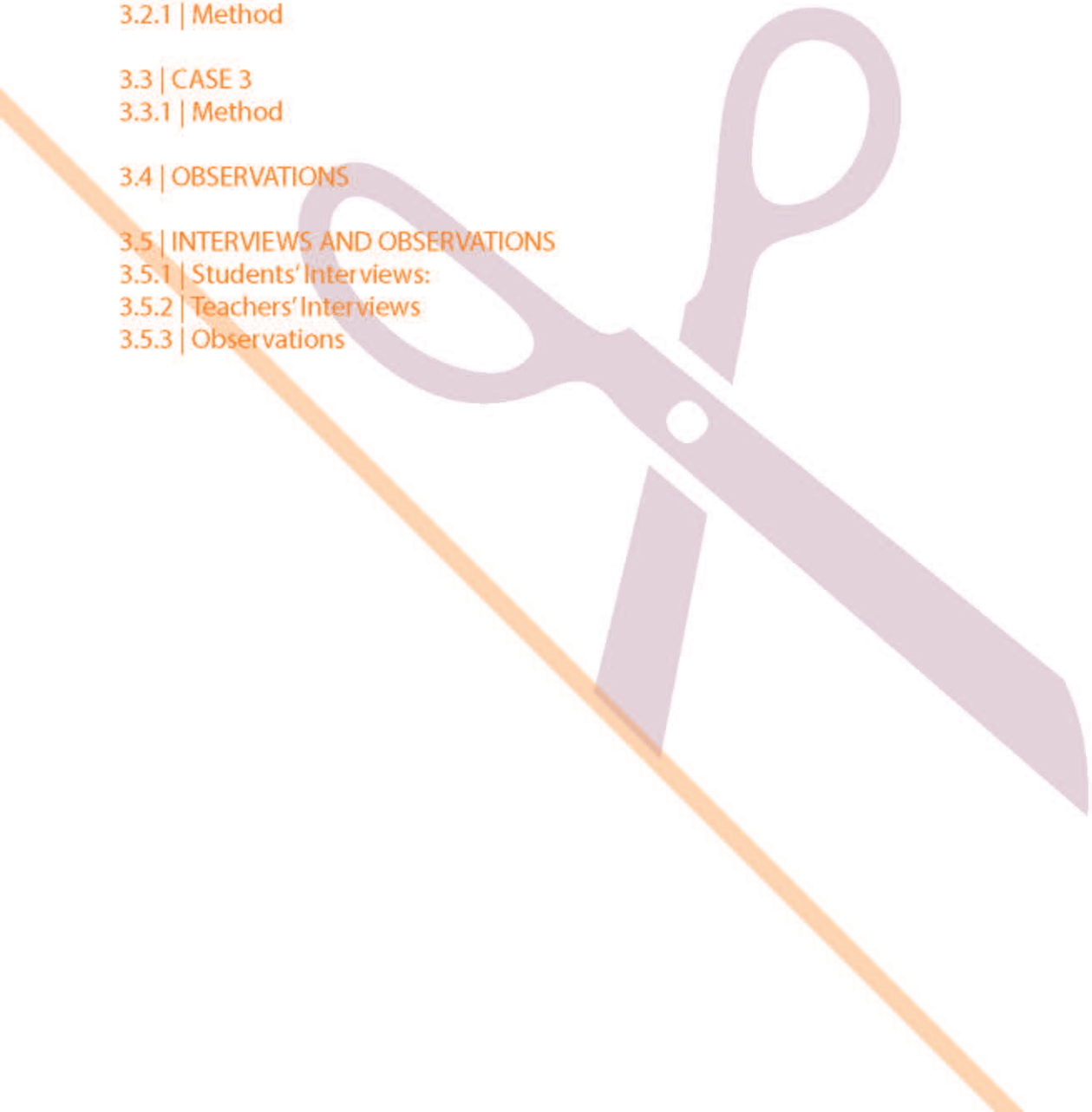
learning theory offers a dynamic theory based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction." According to them, this theory is drawn from the work of well-noted 20th century scholars who used experience as a main element in their theories of human learning and development to further develop a more concrete model of the process of learning from experience. They further state that "The process of learning from experience is ubiquitous, present in human activity everywhere all the time" (KOLB, KOLB, 2008: 3)

> "Learning is best conceived as a process, not in terms of outcomes. To improve learning in higher education, the primary focus should be on engaging students in a process that enhances their learning – a process that includes feedback on the effectiveness of their learning efforts. Education must be conceived as a continuing reconstruction of experience, the process and goal of education are one and the same thing"
>
> Kolb and Kolb (apud DEWEY 1897: 79)

Kolb and Kolb also believe that "Learning is best facilitated by a process that draws out the students' beliefs and ideas about a topic" (Kolb, Kolb, 2008: 4). In an earlier study, Kolb (1984: 41) stated that the Experiential Learning Theory defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience."

> "Experiential learning is a process of constructing knowledge that involves a creative tension among the four learning modes that is responsive to contextual demands. This process is portrayed as an idealized learning cycle or spiral where the learner 'touches all the bases' – experiencing, reflecting, thinking, and acting – in a recursive process that is responsive to the learning situation and what is learned. Immediate or concrete experiences are basis for observations and reflections."
>
> (Kolb, Kolb, 2008: 5)

3 | Study Of Cases



3 | STUDY OF CASES

Three cases were selected for comparison in order to find out the efficiency of current methods used to teach and learning patternmaking. This involved observing the teaching methods used by patternmaking teachers in a class of students that did not have earlier experience of the subject. Students and teachers were interviewed to understand their teaching and learning methods and the methods were compared and conclusions drawn from the overall results of the students' ability to absorb information and put it to use. This was possible after studying the history of patternmaking and the methods used to teach patternmaking as well as reviewing teaching aids such as books, blogs, websites, etc.

In this study, a descriptive survey was used, which is a method of research used in order to portray an accurate profile of persons, situations or, in this case, events. This method is usually used to answer questions that ask who, what, where, how much and how. This study consisted of about 66 students and 3 teachers in two different countries. It was crucial to select cases that were not the same in terms of teaching methods while also keep a track of the variables in order to facilitate the answering of the research questions for this study. In order to collect data for this study, interviews with students and teachers and class observations were used. The collection of data of the case studies took place between 18th February 2016 and 7th June 2016. Interviews with students were casual and had to be informal and quick because most of the students were in a hurry to complete projects and because of the difference in presentation timings, not all students could be interviewed.

Getting permission to observe and evaluate classes in an institute was not very easy and it took several months to finally get permission. A list of at least 10 universities was made and all were contacted, positive responses from 4 were received and then 2 were selected based on how helpful they would be for this study. To be in two continents at the same time for class observations was next to impossible and for this, classes missed were video recorded and watched in order to observe all classes. Observations were made in the classrooms with the teachers and students in an uncontrolled environment, most students in Case 1 and Case 3 were unaware that they were under observation until they were finally interviewed.

Detailed notes were written at every class in order to later on analyze the classes better and draw stronger and more accurate conclusions.

The following table gives us an overall look at the three cases that were observed.

Table 1 - Table representing the comparison of cases observed (Author, 2016)

Class Information	Case 1	Case 2	Case 3
Location	Lisbon, Portugal	Mumbai, India	Mumbai, India
Course Length (years)	3 years	1 year Foundation + 3 years specialisation (in this case Fashion Design)	3 years
Students' year	2nd year	2nd year	1st Year
Number of classes	14 classes	14 classes	16 classes
Semester length	3 months	3 months	3 months (however classes were conducted for this case in 16 days)
Class length	3 hours once a week for 14 weeks	6 hours once a week for 14 weeks	3-4 hours , 6 days a week for less than 3 weeks
Total hours of class	42 hours	84 hours	48 hours
Number of students	48 divided into 2 batches.	12 - 15	6
Students' Age Group	19 - 21	19 - 20	19 - 22
Drafting tasks	Basic skirt and pant blocks and variations of each.	Basic bodice and skirt and deconstruction of a shirt.	Basic skirt, bodice and sleeve blocks and variations of each.

Teaching Aid	Drafting notes and instructions created by the teacher provided to the students	Copies of drafting instructions from a well known patternmaking book handed out to students. Mannequins also used	Copies of drafting illustrations with minimum instructions were handed out to students
Method used (2D or 3D)	2D	Mostly 3D but 2D was also introduced to students.	2D
Teaching Method	Students were introduced to patternmaking history, terminology and tools and were asked to draft skirt and pant blocks individually, variations of skirts and pants were drafted in groups and "taught" to the rest of the class. Final project included drafting and producing 3 pieces (skirt s or pants or both) individually.	Students were taught the terminology and tools of patternmaking. Draping a basic bodice was demonstrated and later used as reference while explaining how to draft a block using. The skirt was taught the same way, students were asked to do draft individually the two basic blocks and later allowed to drape them. Final project involved students deconstructing a shirt to make a garment for the upper body.	Students were taught terminology, tools and cutting instructions of patternmaking and how to take measurements. Drafting of the basic skirt was demonstrated to the class and they were then asked to repeat the process. Variations in miniature blocks were taught and drafted with the same process. Basic bodice draft was discussed in class with students filling in instructions, and later completing these drafts. Sleeve draft was drafted in the

			same way along with bodice and sleeve variations. Final project involved drafting a variation of a bodice or skirt and sewing a toile.
Importance of flat patternmaking in the course	Flat patternmaking is given a lot of importance and encouraged in this course and most students use patterns to produce garments for most of their projects.	Flat patternmaking is not given much importance and students are given freedom to choose between Flat patternmaking and draping to produce garments for their projects. Most students choose draping.	Flat patternmaking is given great importance and encouraged in this course. Most students use patternmaking to produce garments for most of their projects.
Final Project	Drafting and producing samples of 3 variations of skirts or pants or both.	Deconstruction of a shirt to produce a garment for the upper body.	Drafting and toile of 1 variation of a skirt or bodice with or without sleeves.
Expected achievement through final project	Focus was not on how well the garment was sewn but on the final shape and patterns and whether the students understood the drafting methods and could put them to use.	Focus was not on the sewing but on the process and shapes achieved while experimenting with the shirt and the final shape of the garment.	Focus was not on how well the garment was sewn but on the process of drafting, the pattern pieces, cutting instructions and on the ability to put a garment together.

3.1 | CASE 1

This case study took place in Lisbon, Portugal at Faculdade de Arquitectura da Universidade de Lisboa. It was 3 months long, from the last week of February to the first week of June with a total of 14 classes conducted during the semester. Because of the size of the class, it was divided into two batches, a morning batch at 8am to 11am and an afternoon batch from 3pm to 6pm every Thursday. The class had a majority of female students and there were around 5 male students. The professor used the same method while teaching both batches.

Lecturer: Prof. Ines Simões

University: Faculdade de Arquitectura da Universidade de Lisboa

Place: Lisbon, Portugal

Term: 3months

Course: 2nd Year, Bachelor's Degree in Fashion Design

Class: Patternmaking 1

Frequency: 1class per week, 3hours

Number of classes: 14 classes

Total hours of class: 42 hours

Number of students: 48 students

Age: 19 - 21

3.1.1 | Method

In this case, students worked both, independently and in groups. For the first two exercises, students worked individually to draft skirt and pant blocks whereas for the first and second projects, the professor introduced a reverse teaching method where, although she provided all the necessary information to help them while drafting and making patterns, the students were to work in groups and teach the classmates of other groups what they had learned and how they had made the final patterns.

After a class of introducing the subject, the projects ahead and a discussion on the history of patternmaking and the tools and instructions involved, students began with the first exercise, followed by the second exercise, then the first and second projects and their presentations after each of them, and finally the final project.

This class was three hours long. Even though the class hours seem short, flat patternmaking is given a lot of importance and encouraged in this course and most students use patterns to produce garments for most of their projects during their course. Students in this class did not have much experience in sewing and draping and these are separate subjects taught to the students either earlier or later on in the course. Students had access to a seamstress for doubts that they may have had while sewing their projects.

There were a total of five assignments that the students had to complete in this class – two blocks, 2 presentations of variations using the blocks and the final project of producing three garments for the lower half of the body, putting into use what they had learnt in class. Students were provided with notes and instructions created by the lecturer herself. These notes were elaborate and precise enough for students to follow them and draft the required blocks and patterns. In the first two and the last assignments the students worked individually while in the third and fourth assignments, students worked in groups to draft patterns and later 'teach' their process to the class in their presentation. Although the teacher provided the students with all the necessary information to help them while drafting and making patterns

and was available in class to help students when they needed it, she encouraged them to work on their own, she used a “Teach less” method like Wilson and Gerber (2008: 35) talk about.

In the beginning of the semester, the students were introduced to flat patternmaking; they were also spoken to about the history of patternmaking and the tools and terms involved. The main unit of measure used here was centimeter which is what most books and notes also use and mostly because Portugal (and most of the world, except for the United States, Myanmar and Liberia) officially follows the metric system. Most students in the class were part of the Fashion Design course while there were a few from the Architecture course also attending the classes.

At the end of the semester, through the final project, the teacher was focused on understanding the students’ thought process and wanted to see if the students had understood the overall concept of flat patternmaking and were able to put what they had learnt to use, rather than whether they had managed to present a well finished garment.

The teacher in this case did not sit at a desk, but moved around the class attending to questions and difficulties the students may have had. Students were comfortable to ask the teacher questions they had while drafting and the relationship between the teacher and students was casual, the teacher displayed a lot of enthusiasm and it was clear that this was a subject that she enjoyed teaching and had a lot of knowledge about, which seemed to, in turn, motivated the students and they seemed to gain more confidence with each assignment.

Exercise 1

This was the first time that students were drafting a pattern. For this exercise, students were to draft a skirt block. The students worked individually, following notes and instructions created by Professor Ines herself, that were emailed to them a few days ahead of class to draft their blocks. Throughout the process, although the students had notes to follow, the professor was present to answer any questions and clear any doubts that they had. The students took approximately two classes to complete this exercise.

Exercise 2

For this exercise, students were to draft a pant block. According to the notes, the pant block was to be drafted using the skirt block, that they had drafted earlier, as guidance. Again, the students worked individually, following notes and instructions created by the Professor, to draft their blocks. Like the exercise before, the professor was present to answer any questions and clear any doubts that they had. The students took approximately two classes to complete this exercise.

Project 1

The students were asked to divide themselves into groups for their first project. This project required them to create patterns within either the "V", "H" or "A" skirt categories and later to teach or explain the process to the classmates of other groups. Students took about 4 weeks for this. There were some groups that worked more often than others, the pace of all groups was different, and some groups were testing and trying out variations of the same skirt, trying out on different fabrics. The methods used by most groups to create the patterns as well as to teach them were not very different, yet there were one or two groups that stood out.

Presentations: Most groups consisted of 5 to 6 students, and their task was to teach the classmates of other groups the methods used by them to draft the skirt category that they had selected to study. Students switched between holding up their drafts and pinning them onto the wall. All groups had followed the basic drafting notes provided by the professor, a few made extra drafts with variations, few had referred to books and information from the internet as additional resources. Most groups had test fits, some life-sized, others miniature, to give the classmates of other groups a rough idea of what the finished garments looked like. One or two groups went a step ahead and made test fits in various fabrics to explain the effect that the fall of a fabric has on the shape of the garment. Some brought store-bought skirts as examples. There was a lot of interaction between the students presenting and those that were watching. There were a few students that were taking notes. Most groups were able to answer questions and queries of the students they were presenting to

with the exception of 1 out of 7 groups that had a lot of difficulty explaining the methods to the students and needed lots of help from the professor to explain and answer questions. Some group members lacked motivation.

Overall, the professor was pleased with the results and ability of the groups to not only produce a finished draft, but to also explain to the class their methods. When asked, students said that they had understood the methods and that it was not as difficult as they expected it to be.

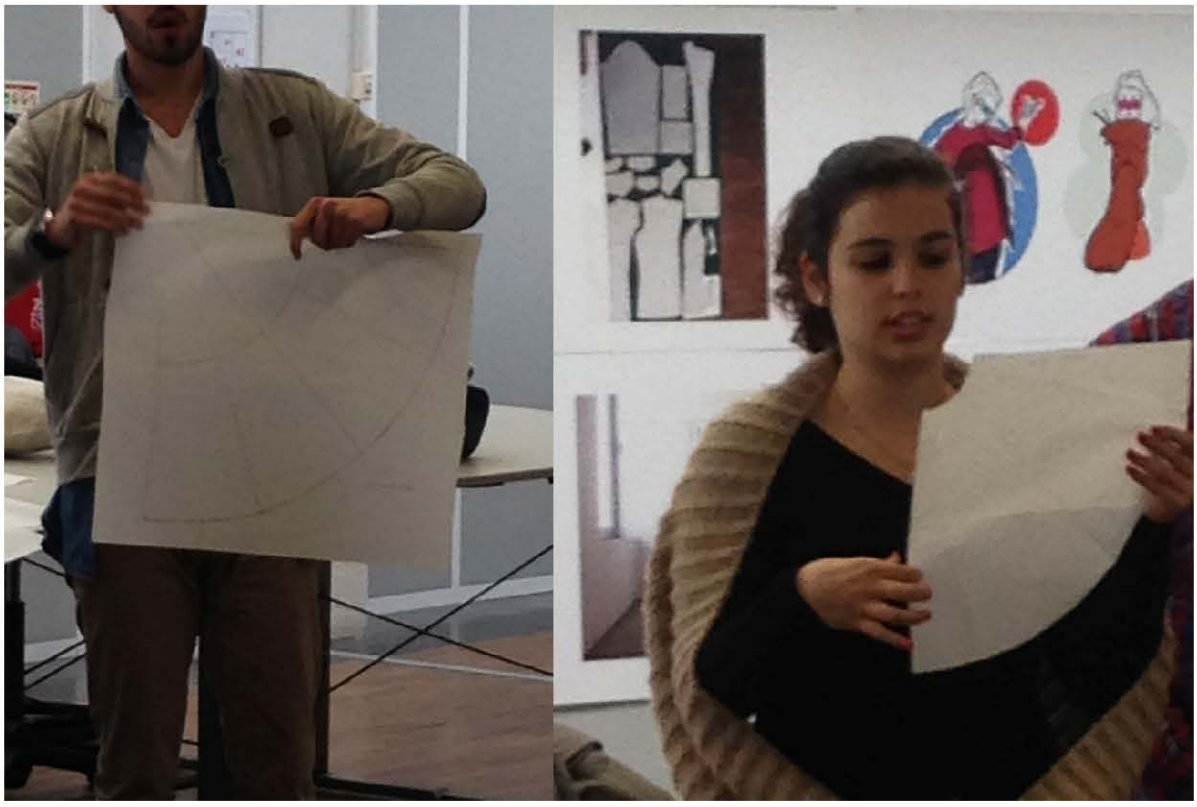


Figure 2 – Photograph of students teaching the class during their presentation (Author, 2016)

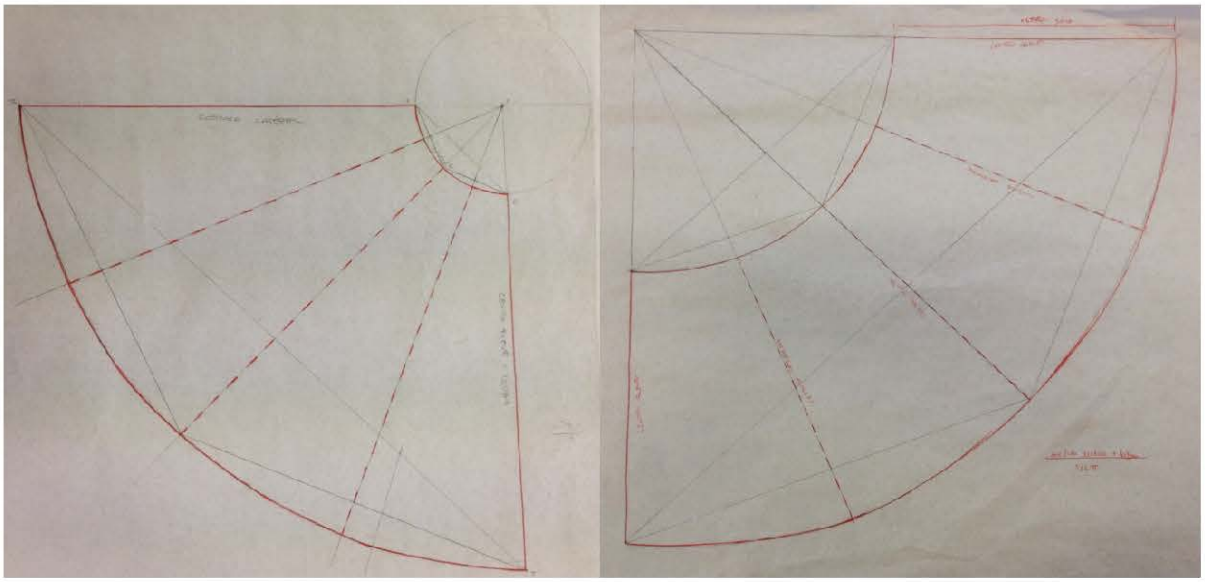


Figure 3– Photograph of students' circular skirt draft (Author, 2016)

Figure 4 - Photograph of students' miniature 'V' skirt toile. (Author, 2016)

Figure 5 – Photograph of students' miniature 'V' skirt toile. (Author, 2016)

Note: Of all the groups that presented, two groups' presentations stood out, Group A3 and Group B1.

Group A3:

The presentation of this group was well organized. They produced and presented step-by-step visuals of their process and this helped them "teach" the class better. Lines were marked clearly in coloured markers to show the changes made in each step and drafts were labeled, notches were marked and pattern pieces had cutting instructions and seam allowance. This group explained all steps in detail and had the most amount of variations of skirt drafts.

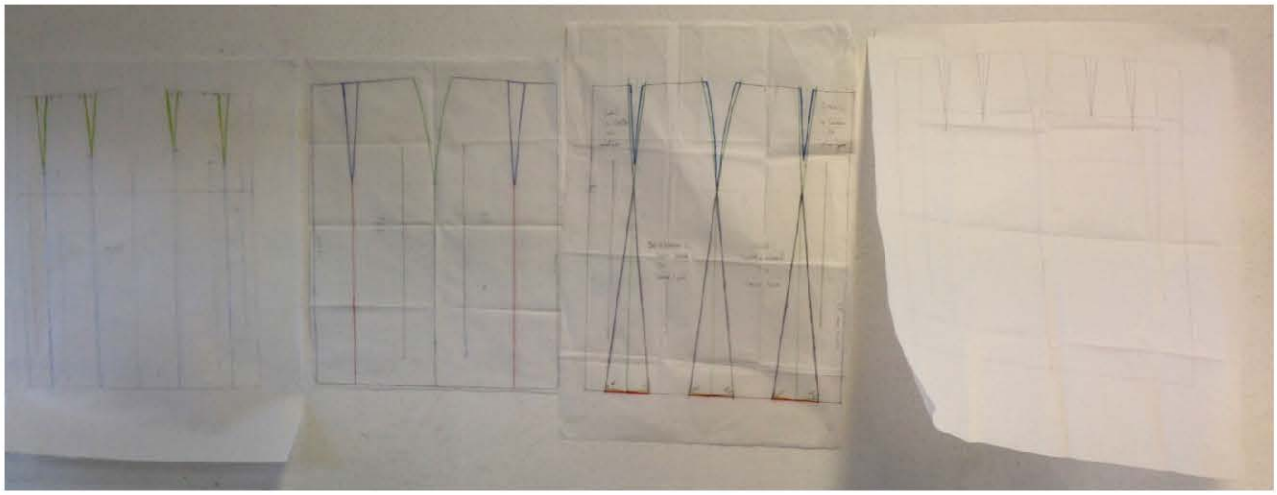


Figure 6 – Photograph of students' drafts pinned on the wall. (Author, 2016)

Students of this group presented:

- Combining 2 darts into a single dart.
- A straight 6 piece panel skirt was drafted from the single dart skirt.
- From the straight panel skirt, a flared panel skirt was drafted.

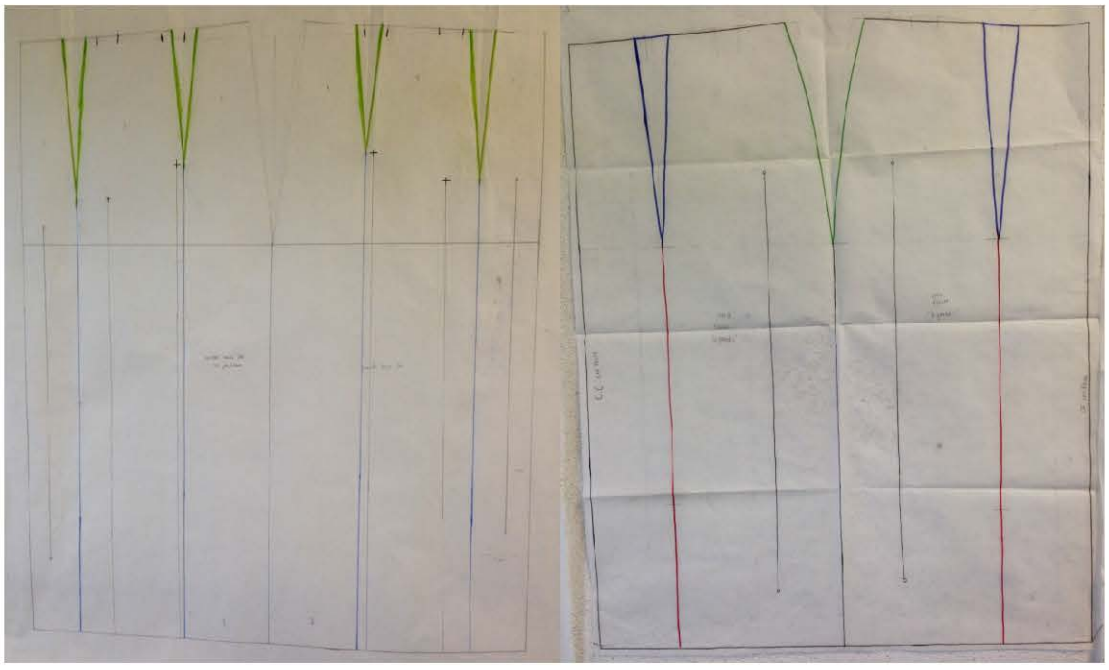


Figure 7 - Photograph of students' draft combining 2 darts into a single dart and draft of a straight 6 piece panel skirt. (Author, 2016)

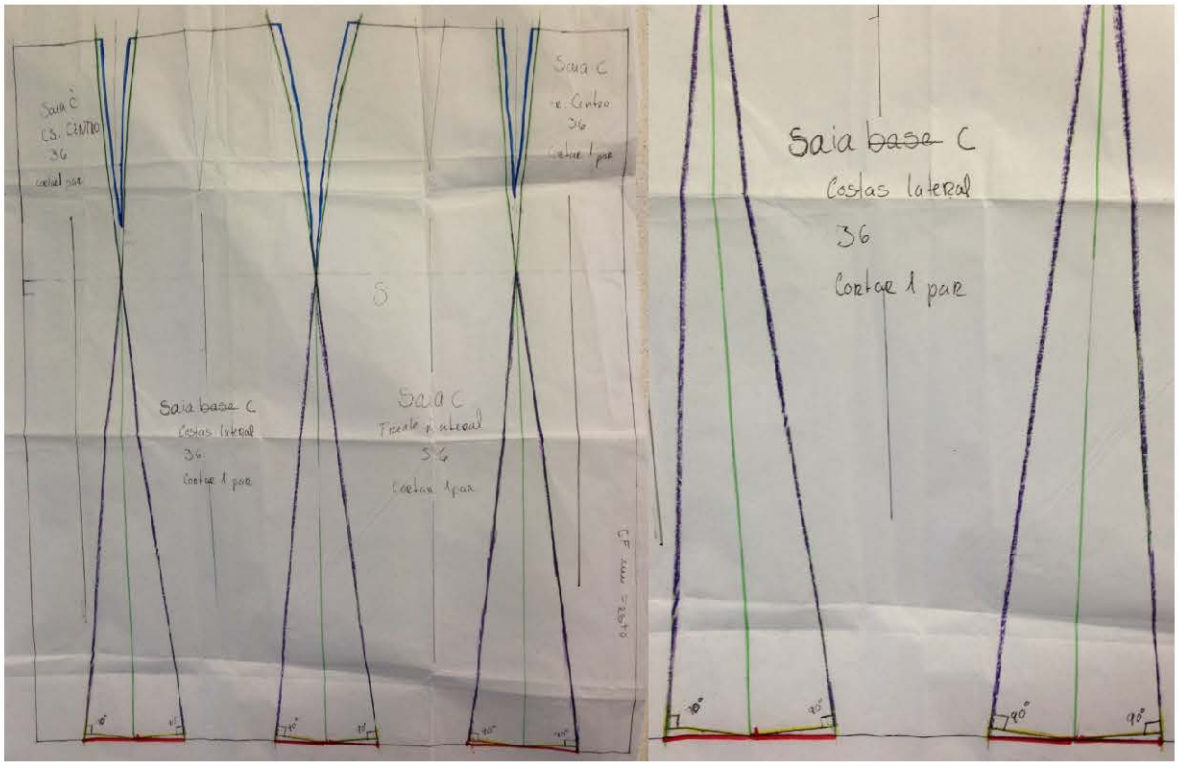


Figure 8 – Photograph of students' draft of a flared 6 piece panel skirt. (Author, 2016)

- Using the 2 darts skirt again, students showed how a yoke could be drafted while also showing how to shorten darts.
- Using the single dart skirt again, the group showed how a skirt with pointed panels could be drafted and how to shut darts on pattern pieces.
- A skirt with curved panels was drafted using the single dart skirt.
- Students showed the class how they had drafted a pleated skirt with parallel volume without using a basic skirt draft.

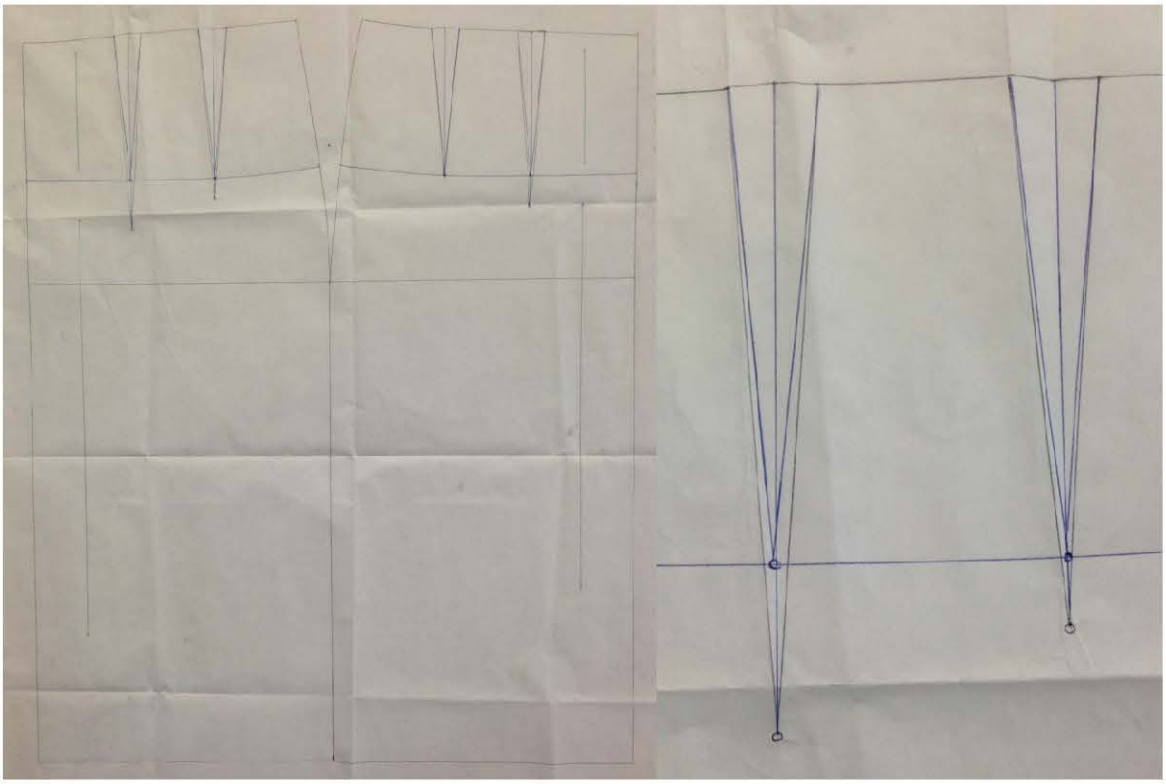


Figure 9 – Photograph of students' draft for a yoke and shortening of darts. (Author, 2016)

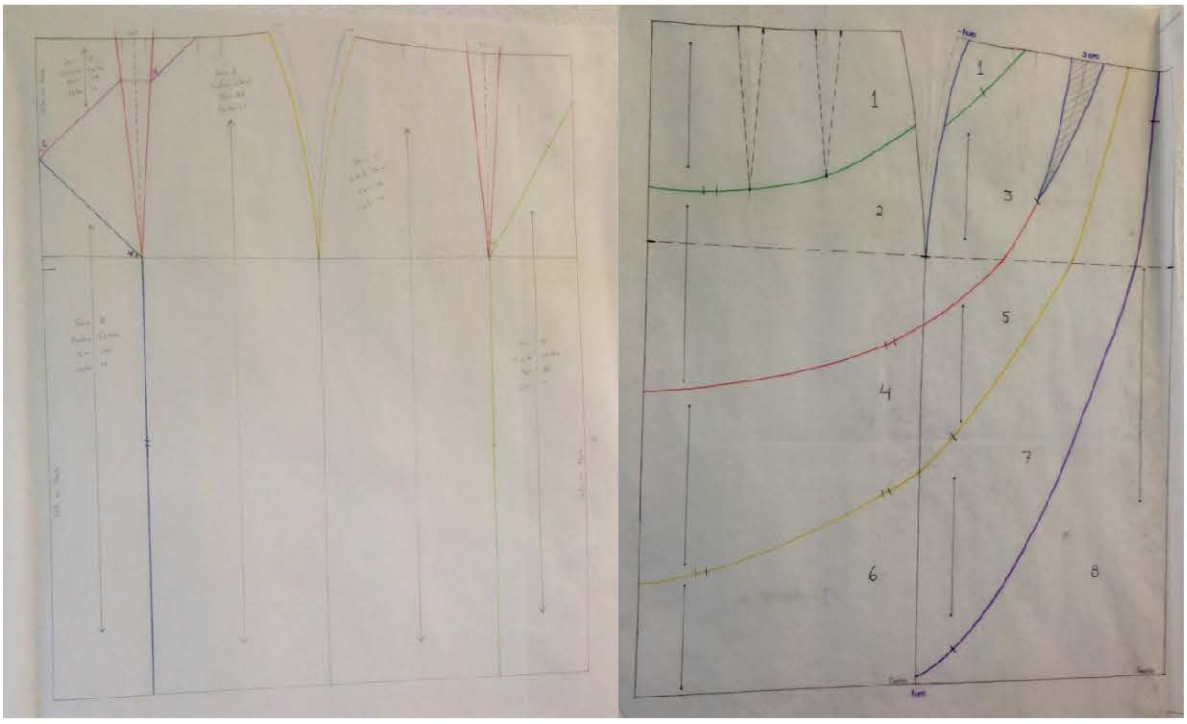


Figure 10 - Photograph of students' draft for a skirt with pointed panels and draft for a skirt with curved panels. (Author, 2016)

Figure 11 – Photograph of students' miniature toile of a skirt with curved panels. (Author, 2016)

Figure 12 – Photograph of students' draft for a pleated skirt. (Author, 2016)

Group B1:

The students presented tulip or "V" style skirts. This group had miniature toiles in different fabrics for different styles. The class interacted with this group a lot and many students took notes. Through this group's toiles, the class could see the difference in shape depending on the volume added and style lines. The style lines were marked in red to highlight where volume would be added. The group had the final pattern pieces transposed on to hard plastic. The students used the white board to write down important points and instructions before and while teaching.

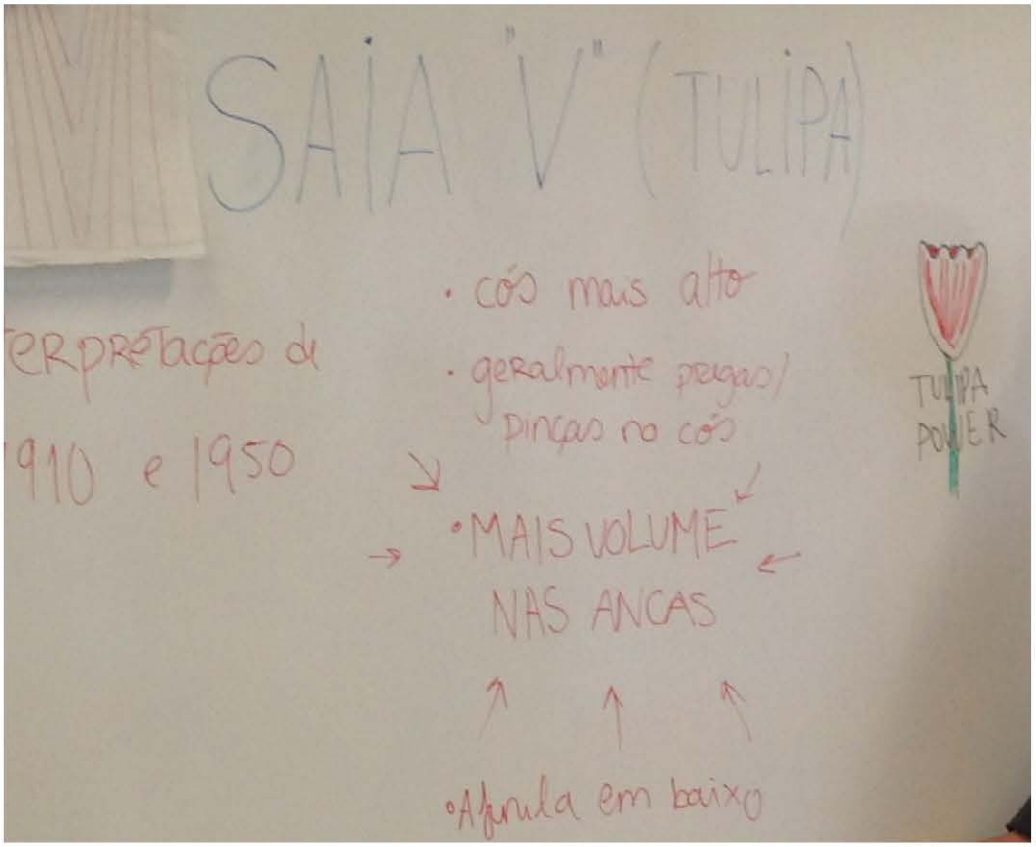


Figure 13 – Photograph of information written on the whiteboard. (Author, 2016)

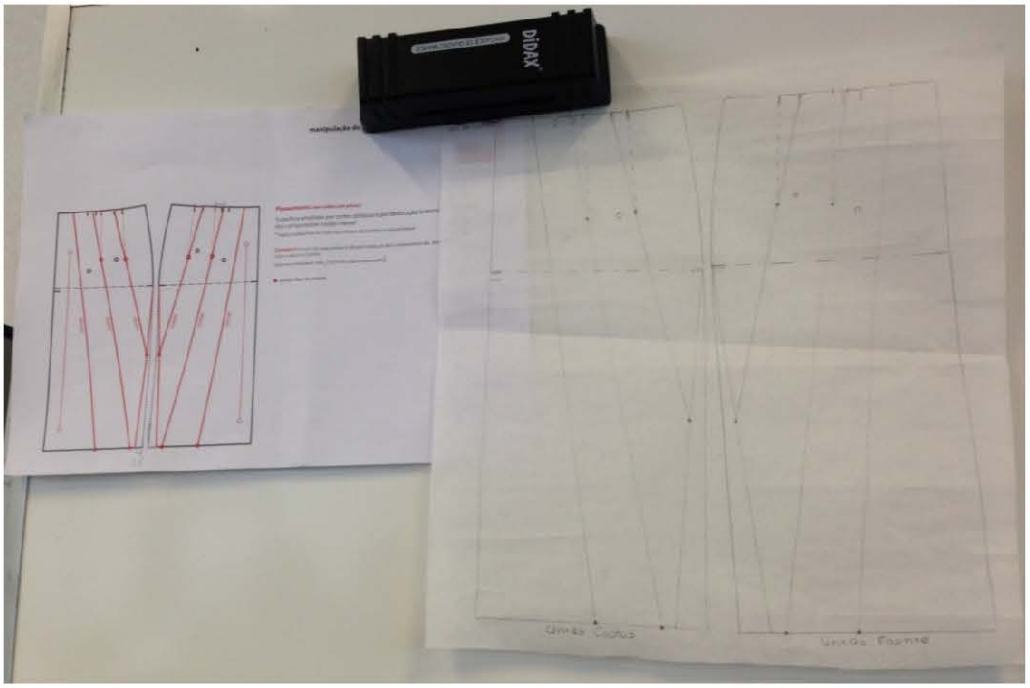


Figure 14 - Photograph of the students' drafts. (Author, 2016)

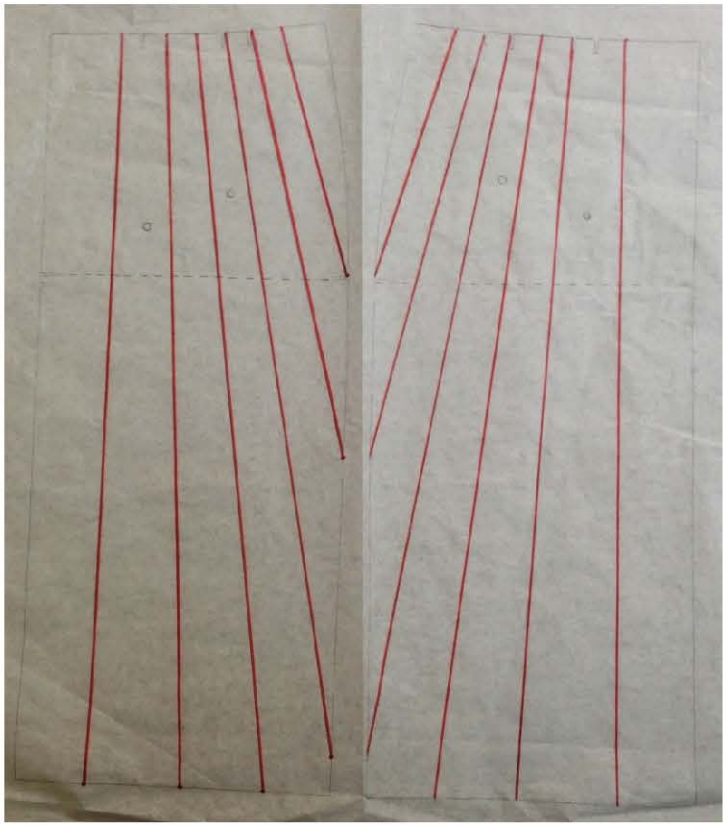


Figure 15 - Photograph of the students' drafts highlighting slash lines. (Author, 2016)

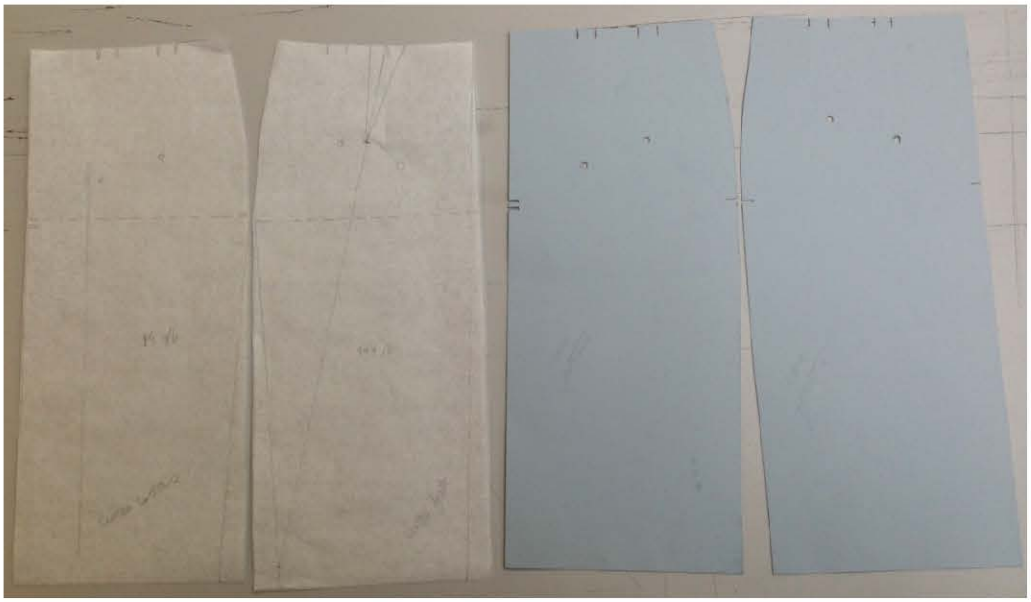


Figure 16 – Photograph of the miniature blocks for the basic skirt. (Author, 2016)

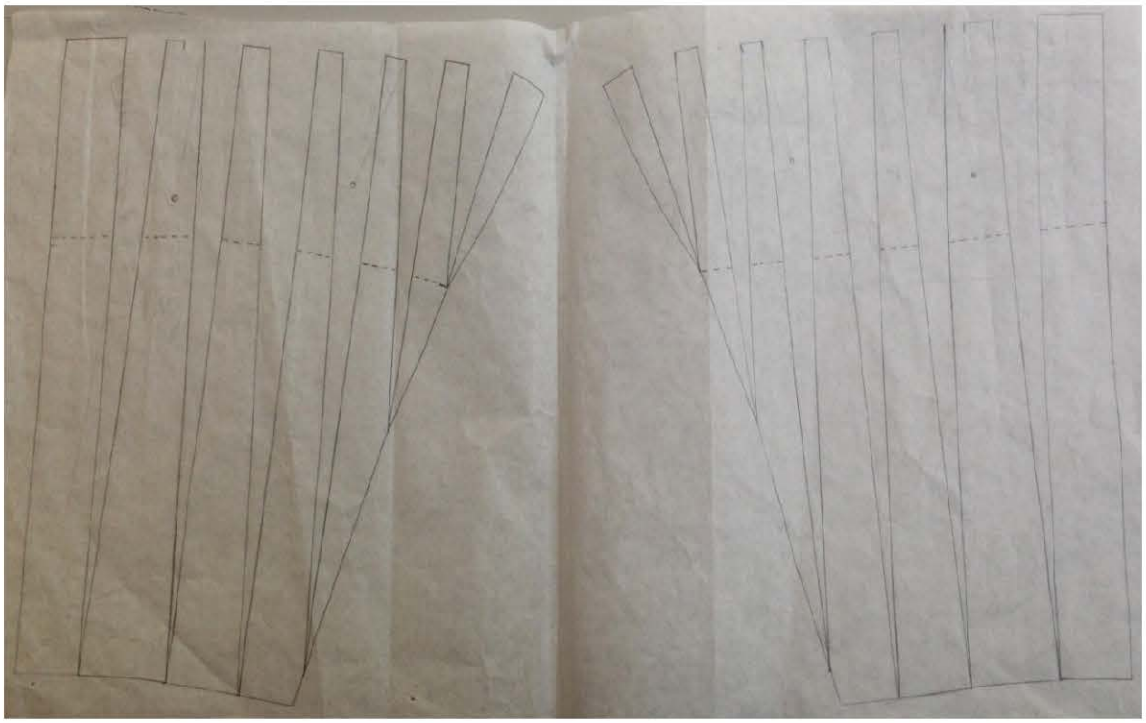


Figure 17 – Photograph of students' drafts after adding volume between slash lines. (Author, 2016)

Figure 18 – Photograph of the miniature toile. (Author, 2016)

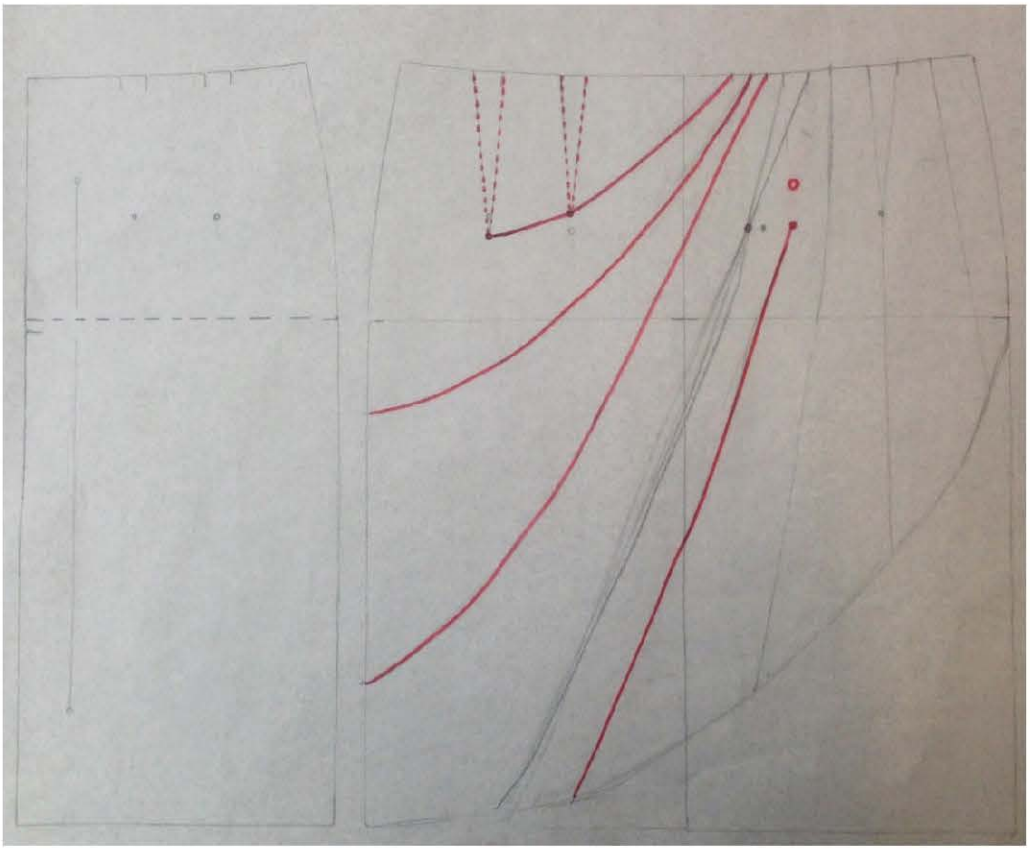


Figure 19 – Photograph of the draft for wrap-over skirt with pleats. (Author, 2016)

Figure 20 – Photograph of the miniature toile for the wrap-over skirt. (Author, 2016)

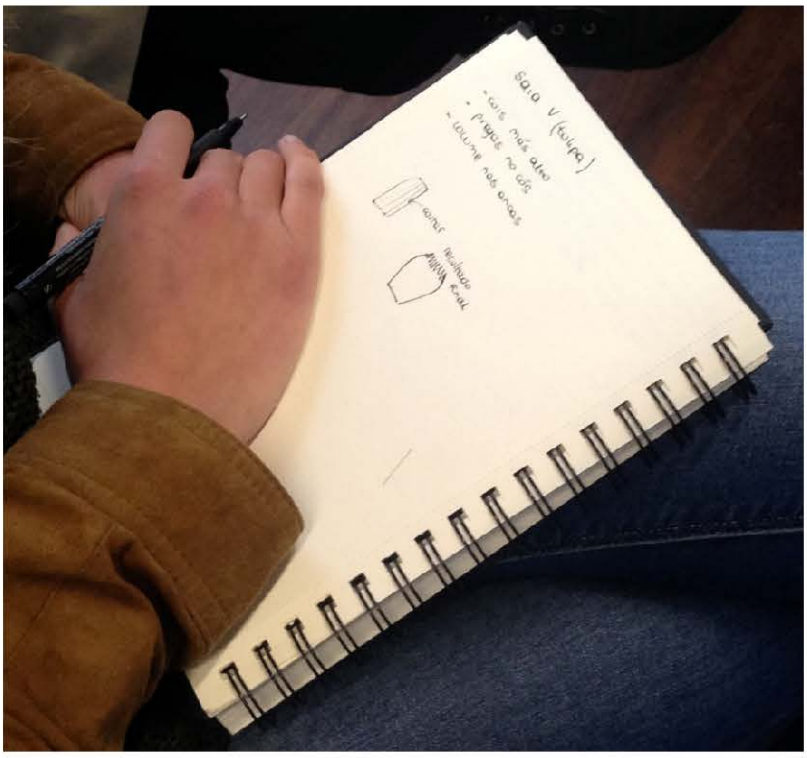


Figure 21 – Photograph of a student taking notes. (Author, 2016)

Project 2

This project was similar to the previous one. Students were now asked to draft Pegged, Pleated, Straight, Flared pants and Jeans in the same groups and "teach" the class the methods used. Being their third chance at drafting, students seemed more confident and did not need as much help and time (they used 2 weeks for this project) to draft the pants.

Presentation: It was clear that students had paid attention to suggestions and ideas from the previous presentation because there was an improvement in presentations. Instead of holding up their drafts, all students had now pinned up their drafts on the wall so it was easier to see. There were more test fits made and variations of some pant styles were done in different fabrics, students had more confidence while explaining and answering questions, there was little or no help from the professor while doing so. Students of one of the groups were wearing finished samples of the pants that they had made.

Similar to the previous presentations, groups had life-size and miniature test fits, many had step-by-step drafts and paper patterns (as done by Group 3 for the skirt presentation), there were basics and variations, few groups brought in store-bought examples.

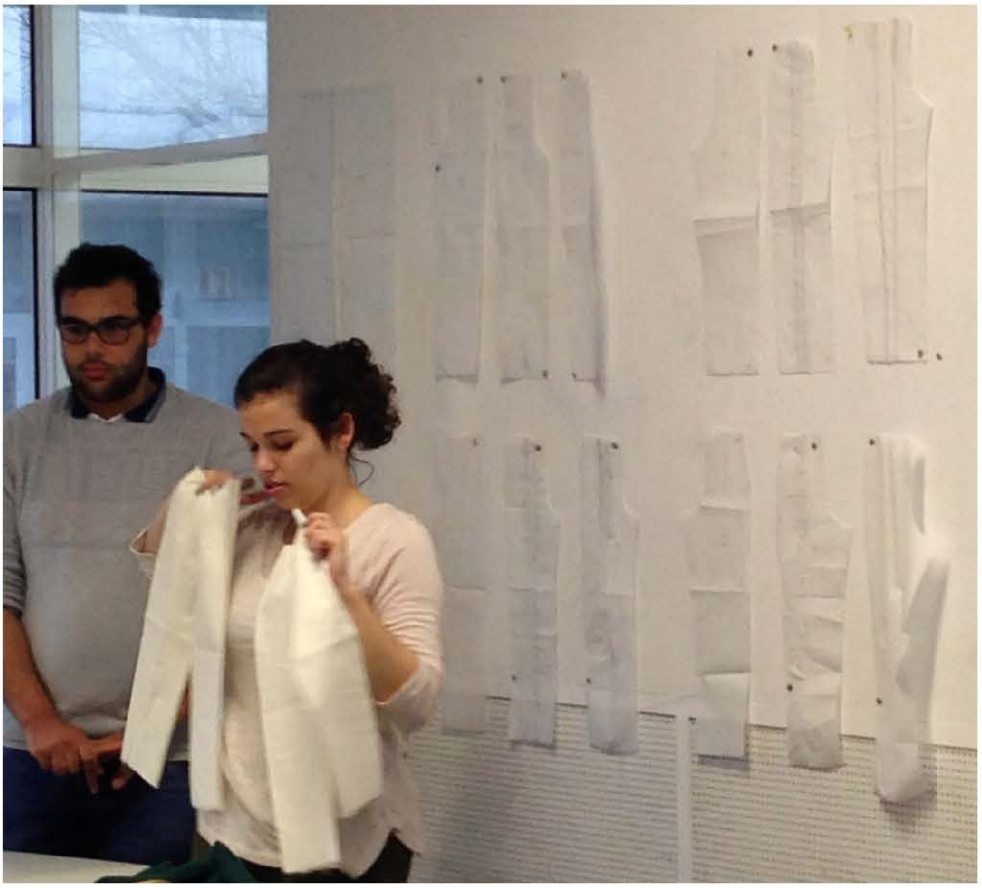


Figure 22 – Photograph of a student teaching the class. (Author, 2016)

Figure 23 – Photograph of students presenting, wearing pants that they had drafted. (Author, 2016)

Project 3 (Final Project)

For this project, students had to work individually to design and make three garments, with skirts or pants or a mix. It took them about 3 weeks to develop the patterns and by the 4th week most students had test fits and almost ready garments, while a few had finished their garments and were wearing them.

Presentation: The students presented their finished garments along with the drafts and pattern pieces. Students seemed motivated to draft different styles of one garment type. Some made both skirts as well as pants, some tried different fabrics and prints and a few tried to add different textures to existing fabric.

Figure 24 – Photograph of a student's final project . (Author, 2016)

Figure 25 – Photograph of students' final project with textures and pleats. (Author, 2016)

Figure 26 – Photograph of a student's final project with pintucks and pleats. (Author, 2016)

Figure 27 – Photograph of a student's final project . (Author, 2016)

Figure 28 – Photograph of a student's final project . (Author, 2016)

Figure 29 – Photograph of a student's final project . (Author, 2016)

Figure 30 – Photograph of a student's final project. (Author, 2016)

3.2 | CASE 2

This case study took place in Mumbai, India at ISDI Parsons. The course was 3 months long, from February to June but the students had a break just before their final presentation in order for the BA students enrolled in other colleges to take their exams. There were a total of 14 classes conducted in the semester. The class was from 8.00 am to 2pm every Monday. The class consisted of female students.

Lecturer: Anonymous

University: Anonymous, Mumbai

Place: Mumbai, India

Term: 3months

Course: 2nd Year Bachelors Degree in Fashion Design

Class: Creative Patternmaking

Frequency: 1class per week – 6hours

Number of classes: 14 classes

Total hours of class: 48 hours

Number of students: 12 to 15

Age: 19 – 20 years

3.2.1 | Method:

In this method, students were first taught patternmaking by first draping on mannequins and later transferring the drape on to paper. This method helped students understand the concept of darts and volume. Later they were Introduced to the concept of blocks and flat patternmaking. Students worked in inches (like most colleges in India) as it is the unit used by tailors and majority of the designers in India even though India is said to have officially adopted the metric system in 1956. The students in this class had a seamstress that was also present in class and taught them various sewing details. Students of this class were aware that they were being observed.

This class was six hours long. Flat patternmaking is not given a lot of importance in this course and students are encouraged to experiment with draping as well as flat patternmaking, most students prefer to drape garments for their projects because “it doesn’t need calculations and (they) can see directly what their garment will look like.” Students in this class did not have much experience in sewing as it is a separate subject taught to the students in the same semester. The concept of draping is included in this class. Students had access to a seamstress for doubts that they may have had while sewing their projects.

There were a total of three assignments that the students had to complete in this class – two assignments involved drafting basic blocks and one final project. The students were given notes that resembled those from the Metric Pattern Cutting for Women's Wear book by Winifred Aldrich. The notes were precise enough for students to follow on their own. In all the assignments the students worked individually and the final project involved a presentation of their garments in an exhibition held by the college. The teacher provided the students with all the necessary information to help them while drafting or draping and making patterns and was available in class to help students when they needed it, she also encouraged them to work on their own as much as possible.

In the beginning of the semester, the students were introduced to the concept of flat patternmaking and draping, the tools and terms involved. The main unit of measure used here was inches which is what most colleges in India use, along with all designers and tailors (it is common for students in Fashion Design courses in India to get their projects sewn by tailors). All students in the class were part of the Fashion Design course and there were a few students that were also in BA courses of other fields (mostly economics and business).

At the end of the semester, through the final project, the teacher was focused on understanding the students' thought process through their deconstruction process and experimenting with shapes and to see if students were able to make use of what they had learnt during the semester, rather than whether they had managed to present a well finished garment.

Exercise 1

This was the first time students were drafting a pattern. For this exercise, students were to draft a basic skirt block. The lecturer draped a basic skirt to explain to the students the concept of creating shape with the help of darts, she explained through this drape, the difference in shape when volume is added and taken away at some places on the garment. Later, students were handed notes that were taken from a well known patternmaking book. The lecturer read through and verbally explained the instructions to the students relating the existing basic skirt drape to the flat pattern pieces in the sketch on the notes. After this, students were asked to work individually on their flat patterns, following the notes provided to them. Students were also asked to try to drape the basic skirt block, not as a compulsory part of the exercise, but so that they could understand the different methods of patternmaking. Throughout the class, the lecturer was present to answer any questions that the students had while drafting. The students took two classes to complete this exercise.

The teacher in this case, sat at her desk while students worked but sometimes moved around the class to attend to questions and difficulties that the students may have had. Students were comfortable to ask the teacher questions they had while drafting and the relationship between the teacher and students was casual. The

teacher however, did not display much enthusiasm and it was not very clear if this was a subject that she enjoyed teaching although it was evident that she was knowledgeable in this subject. The students in this class did not seem very motivated or confident in this subject.

Exercise 2

For this exercise, students were to draft a basic bodice block and a basic sleeve block. Again, the teacher showed the class, through a drape, the concept of creating shape (here, the bust shape). The sleeve was not draped. The students were handed out notes to help them draft the basic bodice and a basic sleeve from the same book used before. The students worked individually to draft the basic blocks and like the exercise before, the teacher was present throughout to answer the questions that students had while drafting. The students took 3 classes to complete this exercise.

Final Project:

For this project, students were required to use a ready-made, store bought, basic shirt to create a new garment for the upper body. From this, students learned the concept of deconstruction. They also learn, while deconstructing, how a shirt is made and the pieces it is made up of. It is through this that they are aware of the collar, pocket placement, yoke, back pleat, cuffs and other elements. Students were allowed to drape or make patterns and then cut into the ready-made shirt. The pace of all students was different. By the 2nd week of the project, some students were still discussing and finalizing designs with the lecturer, others were already draping and one was sewing. Most of the students had decided to drape their garment, while some were making patterns before. A few used both draping and patterns to get the shape they wanted. Although Sewing is a different subject in the Fashion Design course, the seamstress showed students basic sewing techniques that would help them with their finished garment – sewing of a collar with stand, plackets, button stand and other details that they had not yet learnt in their Sewing class. A week before their last class, most students were on a similar, if not same stage of work,

which was finalizing the draping or pattern pieces. The seamstress helped students with sewing queries while the lecturer helped students that were not too sure of the final look.

Presentation: Students presented their finished garments in an exhibition held by the college. Most students had garments that were sewn by them while others had the final pieces put together by a tailor; this did not matter as the main purpose behind the project was to see the methods that the students used and shapes achieved while experimenting with the shirt and to see the final shape of the garment.

3.3 | CASE 3

Unlike Case 1 and Case 2, the classes of Case 3 were held in a rented space in Mumbai, India and the students of this class belonged to the same university. Students of this class wanted to learn the basics of patternmaking and a special syllabus was put together for them. This course was an intensive course where students came in for 3 to 4 hours from Monday to Saturday. There were a total of 16 classes conducted over less than 3 weeks. Hours were flexible as some students had to attend classes at their college. Students were taught in centimeters rather than in inches (the measurement unit used by most tailors and designers eventhough India officially follows the Metric system.) This is because the students were part of an international college that used centimeters and not inches. Students were able to use a sewing machine but had no prior experience in patternmaking.

Lecturer: Siobhan Mendes

University: N/A

Place: Mumbai, India

Term: 16days

Course: N/A

Class: Womens wear Drafting 1

Frequency: Monday to Saturday - 3-4hours

Number of classes: 16 classes

Total hours of class: 48 hours

Number of students: 6

Age: 19 – 22 years

3.3.1 | Method:

Classes began with an introduction to patternmaking, which included a brief history of the subject, terminology, tools and students were shown how to take the measurements required to draft the necessary blocks.

This class was three to four hours long. Flat patternmaking is given great importance and encouraged in this course. Students use flat patternmaking almost always to produce garments for their projects throughout their course. Students in this class did not have much experience in sewing or draping as they are separate subjects taught to the students in the same semester. Students had no access to a seamstress and for doubts that they may have had while sewing their projects, they would consult the teacher of that subject.

There were a total of three main assignments that the students had to complete in this class – two assignments involved drafting basic blocks and variations using the blocks and one final project. Students were handed out printed sheets of notes that were not created by the lecturer but instead modified according to the intended mwthod of teaching. Students followed these in order to draft a skirt, a bodice and a sleeve block. The notes had minimal instructions but most measurements and instructions were discussed in class so that students could form

notes themselves. Students could not understand the notes in the first class before they were discussed in class, but by the third draft (sleeve block) they were able to understand and make notes using very little help from the teacher. In all the assignments the students worked individually. Students did not have to do a presentation of their work but instead showed their work individually to the tutor. The tutor provided the students with all the necessary information and demonstrations to help them while drafting and making patterns and was available in class to help students when they needed it and although she also encouraged them to work on their own as much as possible, the tutor's demonstrations were detailed and there was more teaching than "Teach Less" in this case.

In the beginning of the semester, the students were introduced to flat patternmaking; a brief history of patternmaking, terminology, tools and how to take measurements. The main unit of measure used here was centimeters. (This is different from what most colleges in India use; however the university that the students belonged to, taught its students in centimeters and so, in their best interest, that was the unit used). All students in the class were part of the Fashion Design course at the same university.

At the end of the semester, through the final project, the students were graded based on the process of drafting, the pattern pieces, cutting instructions including notches and on the ability to put a garment together (following notches and cutting instructions), rather than whether they had managed to present a well finished garment.

The teacher in this case moved around the class constantly to attend to questions and difficulties that the students may have had. Students were comfortable to ask the teacher questions they had while drafting and the relationship between the teacher and students was casual. The teacher was enthusiastic and it was clear if this was a subject that she enjoyed teaching and had a lot of knowledge about. The students were not very motivated and seemed slightly concerned about patternmaking in the first class but by the classes that followed it was evident that the students had developed more motivation and confidence.

Exercise 1

This exercise involved drafting a basic single dart skirt and waistband. Since the notes had few instructions, the steps were explained to the class, and the steps were demonstrated by the tutor while students made notes of their own, elaborating on what was provided to them. After drafting the skirt while explaining the steps to the class, the students were then asked to draft their own basic skirt following the notes they had written. Students were not too confident in the beginning but were able to start the drafts well but had a few difficulties later when it came to shaping of the hip and waist and the dart width. Once the drafts were completed, students were shown how pattern pieces are derived from the draft, how cutting instructions and push points are marked and how much seam allowance is added at specific places. Transposing pattern pieces was not very easy as large sheets of fine tracing paper is not easily available and students were to transpose their patterns on to a new sheet of paper using a tracing wheel, push pins and a cork mat. Throughout the class students took notes of the steps, some made notes and explanation 'post-its' on their drafts for future reference.

In the classes that followed, students were taught using miniature basic skirt stencils and the same teaching method, how to make patterns for 1) Straight panel skirt, 2) Flared panel skirt, 3) Yoke skirt, 4) Flared skirt, using the 'slash and spread' method 5) Tulip skirt and 6) Pleated skirt (Box pleats, Inverted box pleat and Knife pleats). The concept of adding and taking away volume was explained to the students. Examples and pictures of garments resembling each skirt style were shown to the class in order for them to understand the final shape of the skirts. The students took about two to three classes for this exercise.

Figure 31 – Photos of the skirt draft and toile. (Author, 2016)

Exercise 2

For this exercise, students were taught to draft a basic waist-length bodice with a shoulder dart and a waist dart (ideal for making the 'Choli', the blouse worn with the traditional Indian garment, the 'Sari'). By now, the students had understood the notes and some had read the notes and tried to figure them out themselves. Students seemed very interested in the class and did not seem as hesitant as they were in the first class. This time, notes were discussed and read through without demonstrating on paper how the bodice was to be drafted. Students took notes, while discussing the steps that they would have to use when they were drafting the bodice. When all the steps were discussed, students began drafting their basic bodice; this time fewer questions were asked and students seemed more confident. Most had a difficulty with the shape of the armhole. Once the drafts were completed, the pattern pieces that could be derived from this were discussed. Students were shown how to shift the shoulder dart to the armhole. Students were handed miniature bodice blocks to practice on. They then had to transpose the basic bodice blocks and a princess

panel front pattern as homework. The class was also shown how to convert the waist-length block to a hip-length block using the skirt block they had drafted earlier. It was explained that this block could also be used to make patterns for dresses and 'Kurtas' (the Indian tunic). When related to and given examples of Indian garments, students seemed to relate to and understand some concepts better.

The next item to be drafted as part of this exercise was the sleeve. The class was conducted in the same manner as the basic bodice classes, where notes and steps were discussed. Students found the shape of the sleeve cap a bit tricky but managed to draft most of the sleeve independently. Once the draft was complete, students were shown how to apply the addition of volume to sleeves, using miniature blocks. Various sleeve lengths and styles were also explained to the students.

Pattern pieces and trims necessary for finishing off garments such as facings and bias binding were also explained to the class. The students took about three to four classes for this exercise

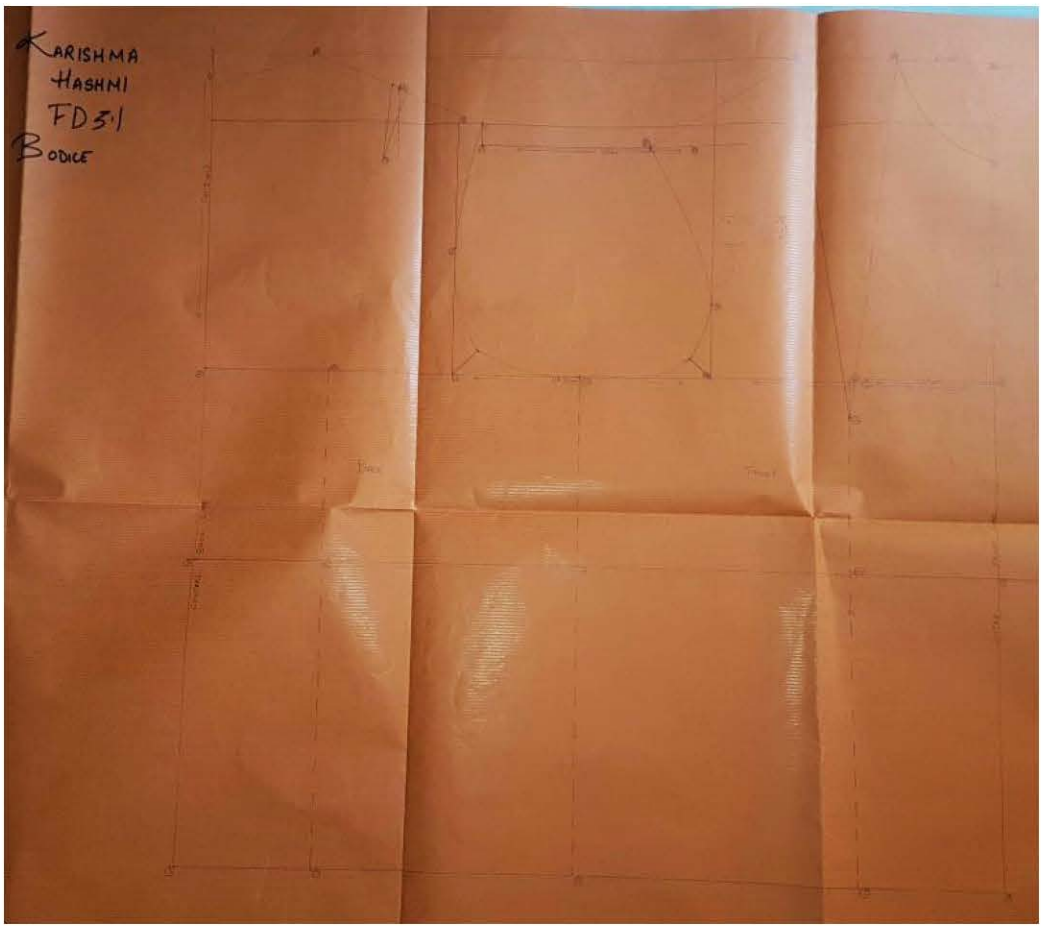


Figure 32 – Photo of the basic bodice draft. (Author, 2016)

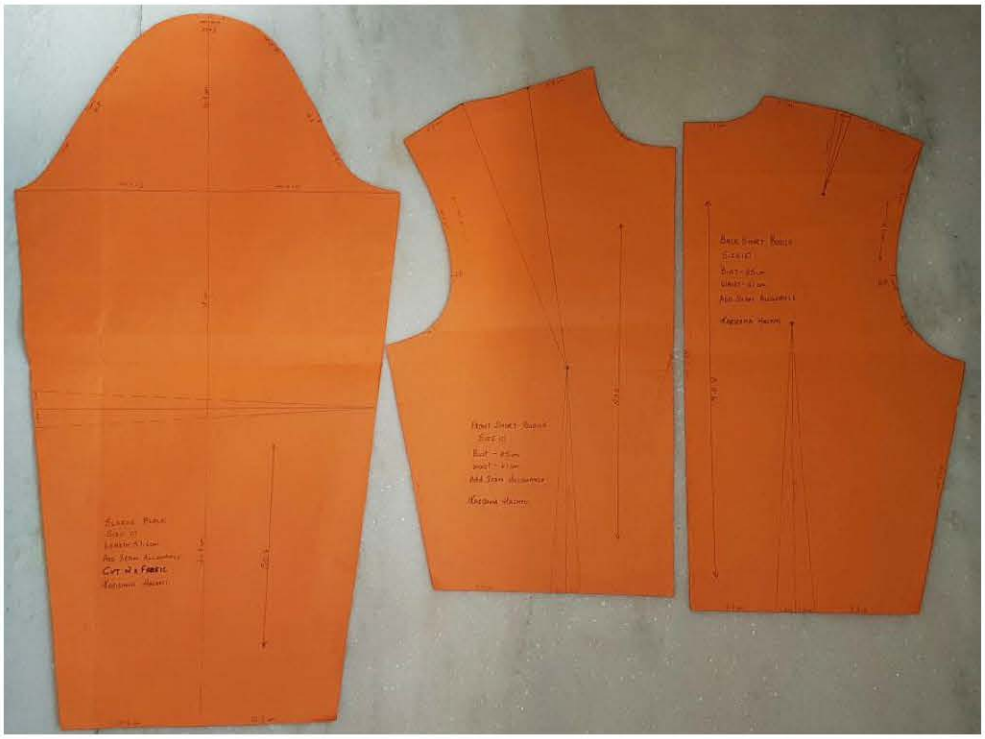


Figure 33 – Photo of basic bodice and sleeve blocks. (Author, 2016)

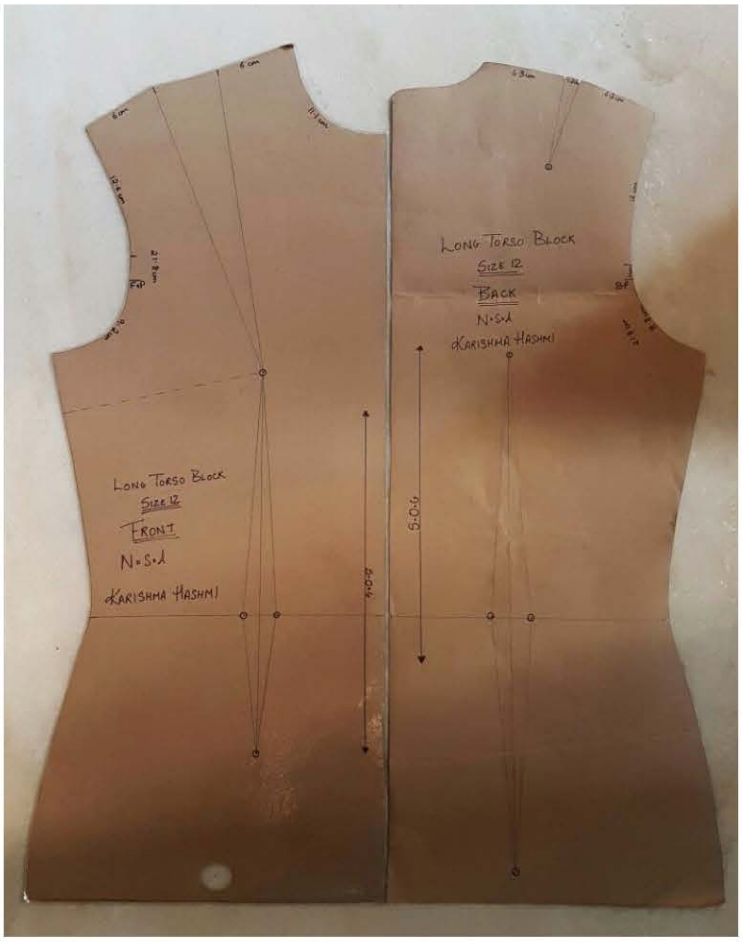


Figure 34 – Photos of the long torso blocks. (Author, 2016)

Final Project

For their final project, students were to design either a skirt or a top, make patterns for it using their blocks and sew a toile. If time permitted, students could then make a finished garment. Students were asked to bring in their designs and discuss them with the tutor. When their design was finalized, they began drafting their garment. The majority of the students designed skirts while others chose to design tops. Students seemed a bit hesitant at first but once they started tracing off their blocks and drawing in style lines, they were more confident. In this class, students stayed for over an hour more than the regular class hours because, as some of them stated, “once I started I didn’t want to stop till it is complete”. Students explained that beginning a pattern or draft or starting off where they had finished from made them a bit unsure but once they started it seemed easy.

All students produced a toile of the garment that they designed by the end of the course. Students were overall happy with their achievements and one of the students exclaimed, “I didn’t think I could have learnt so much in less than 3 weeks!” Students took about six to seven classes for this project.

Figure 35 – Photos of a toile of a student’s project. (Author, 2016)

Figure 36 – Photos of the draft and pattern pieces of a student's skirt project. (Author, 2016)

Figure 37 - Photos of a toile of a student's project. (Author, 2016)

3.4 | OBSERVATIONS

When compared, the only similarities among the three cases was the age group and that all three lecturers were looking to see, through the final projects whether the students had understood well, the concept of patternmaking and whether the students could put what they had learnt or what was taught to them, to use.

The cases were different in many aspects, to begin with, the number of class hours was different, and while Case 1 and Case 3 had similar class hours of 3hours and Case 3 had 2 classes more than Case 1, Case 1 was a three month long course, while Case 3 was a 16 day course. The number of students was different with Case 1 having the maximum number of students while Case 3 had the least number of students. The number of assignments completed by the students in each case was also different, and although Case 2 and Case 3 had the same number of tasks, the tasks in Case 3 were more elaborate (Assignments 1 and 2 of Case 2 required students to draft the basic skirt, bodice and sleeve blocks, while Assignments 1 and 2 of Case 3 required the students to draft the basic skirt, bodice and sleeve blocks as well as variations of each block) and although students in all three cases were given notes to draft from, the notes available in Case 3 had very few instructions and steps which resulted in the tutor interacting and discussing the notes and steps more than the lecturers in the other two cases.

On comparing Case 1 with Case 2, we find similarities in terms of the length of the semester, which was three months and a total of 14 classes and with the teachers using a “teach less” method. The notes provided had many instructions and students followed these to draft their blocks and patterns. However, there were a number of differences when it came to class hours per week, with Case 1 having half the class hours (3hours) that Case 2 had and even though the number of classes conducted in both case was the same, the total work hours in Case 1 was 42 hours while Case 2 had double the hours with 84 hours. When it came to the importance of flat patternmaking in the course, the course in Case 1 gives a lot of importance to flat patternmaking, where as the course in Case 2 does not give as much importance to flat patternmaking and encourages their students to experiment with draping. The

number of assignments and the amount of work completed in each assignment in Case 2 were few, compared to the number and amount of work completed in Case 1's assignments. The students in Case 1 worked individually as well as in groups on their assignments, while the students in Case 2 worked individually on all of their assignments. The classes in Case 1 focused only on flat patternmaking (draping and sewing are separate subjects in the course) while the classes in Case 2 encouraged their students to experiment with flat patternmaking as well as draping, most students in this class used draping to escape from the calculations and list of steps involved in flat patternmaking. The final project in Case 1 was focused mostly on patternmaking tasks while the focus of the final project in Case 3 was on deconstruction.

When Case 2 and Case 3 were compared, apart from the fact that both cases were conducted in the same city and as a result, students were from a similar cultural background and also the fact that in both cases, students worked individually on the assignments, there were numerous differences. Case 2 had double the class hours (6hours) that Case 3 had and Case 2 had a total of 84 class hours while Case 3 had a total of 48 hours. As mentioned in an earlier comparison, it was stated that the course in Case 2 does not give great importance to flat patternmaking, however, the course in Case 3, gives great importance to this subject. The number of assignments was the same (3 assignments), however, the amount of work completed in each task of Case 3 was much more than that of Case 2. Classes in Case 3 were solely based on flat patternmaking (draping is a separate subject taught to students in this course) while in Case 2, students were introduced to flat patternmaking as well as draping. The lecturer in Case 2 followed a more "teach less" approach while the tutor in Case 3 had a lot more discussions with the students before each draft was started. The length of the semester in Case 2 was 3 months, while in Case 3, classes were held for 16 days, although Case 2 had two days less of classes than Case 3. The final project in Case 2 was focused on deconstruction, while the final project in Case 3 was focused on flat patternmaking.

While comparing Case 1 and Case 3, there were a number of similarities, for example, the class hours were similar (Case 3 had 6 more total hours than Case 1), the courses in both cases gave a lot of importance to patternmaking, the amount of work involved in the assignment were similar and in both cases students had to draft variations of the basic blocks that they had drafted, both focused on flat

patternmaking and the final project of both focused on patternmaking. There were fewer differences between these two groups that there were in the previous comparisons. The students in Group 1 worked in groups and also worked individually on certain projects while in Case 3, students worked individually on al assignments. The professor in Case 1 provided students with notes that had detailed instructions to draft each assignment and as a result, managed to follow a "teach less" method while the tutor in Case 3 provided students with notes with very few instructions and hence, spent time discussing with the students, the steps that they would follow to draft their patterns. Another difference was that although Case 1 had 2 days less of classes than Case 3, in Case 1, the semester was 3 months long, while in Case 3, classes were held for 16 days.

From the observations, we can say that Case 1 was the only case to encourage collaborative learning through the two group projects combined with a reverse teaching method. Case 2 was the only case where draping was introduced and the course did not give as much importance to flat patternmaking as the courses in the other cases did and students in this case chose to drape their projects over drafting them, to avoid the calculations and numerous steps involved in drafting. This case also had the least amount of work done in all assignments but the most amount of total work hours. Case 3 was the case with the shortest length of time yet the most amount of classes (16 class as compared to Case 1 and Case 2 that had 14 classes) and was the only case to use notes that had very few instructions. This lead to the increase in the amount of discussions regarding the method of drafting each pattern and as a result was the only case that did not follow a "teach less" approach.

3.5 | INTERVIEWS AND OBSERVATIONS

Teachers and students were interviewed in order to draw stronger conclusions. Students were interviewed at the end of their semester to find out their opinions on the subject, what helped them understand it better, their likes and dislikes, if it is a subject that they look forward to learning more about and practicing,

the teaching aid they like learning with, and other questions that provided us with the necessary information.

Teachers were interviewed to find out if they use the teaching methods that they were taught with, their personal observations, if they change their methods according to the students that they teach, what teaching aid they use, and other important questions.

For the observations, patternmaking classes taught by 3 teachers with a class of first-time patternmaking students were attended, observing the behavior of students and teachers, study and learning methods, relationships formed, use of teaching aids, ability of students to put what they have learned, to use in their projects, etc.

3.5.1 | Students' Interviews:

The 24 students that were interviewed were between the ages of 19 to 22 years. Most of the students were female; just 2 students interviewed were male. Having a lower male to female ratio in classes is not a rare case and in 2 out of 3 of the classes observed, there were only female students. Most students were in a fashion design course, but in Case 1, a few students belonged to the architecture field and chose to be part of the patternmaking class and in Case 2, a few of the fashion design students were also part of another BA program.

When asked whether the students had heard of the subject (patternmaking) before, 80% of students in Case 1, 40% of students in Case 2 and 60% of students in Case 3, replied that they had heard of patternmaking before. The 20% of the students in Class 1 that replied that they were not aware of patternmaking mostly belonged to the architecture department.

90% of the students in Case 1 and 80% in Case 2 agreed that patternmaking is helpful and that they would benefit from it later, while 60% in Case 3 agreed that it would be helpful. Those that did not agree in Case 1 were mostly from the architecture department, while those that did not agree in Cases 2 and 3 stated that they did not feel that patternmaking would be very helpful or important because of the high dependence on tailors in the fashion industry in India. There was also one

student from Case 2 that stated that patternmaking would not help her as she had planned on getting into styling after completing her course while another, also from Case 2 stated that she wanted to start an online fashion business and did not plan on dealing with garment production at all.

On being asked about their opinion about patternmaking as a subject, 60% in Case 1, 20% in Case 2 and 40% in Case 3, said that they liked the subject so far, while 30% in Case 1, 60% in Case 2 and 50% in Case 3, stated that they struggled in the beginning and found it complicated at first but by the end of the semester they were more confident and did not hate the subject. 10% in Cases 1 and 3 and 20% in Case 2 said that they did not like the subject at all. 10% of the overall count of these students stated that they did not dislike the subject if they liked the design of what they were drafting and found it interesting and 20% of the total amount of students interviewed said that they felt that if they had more experience and practice in the subject they would probably like the subject or be more excited about it.

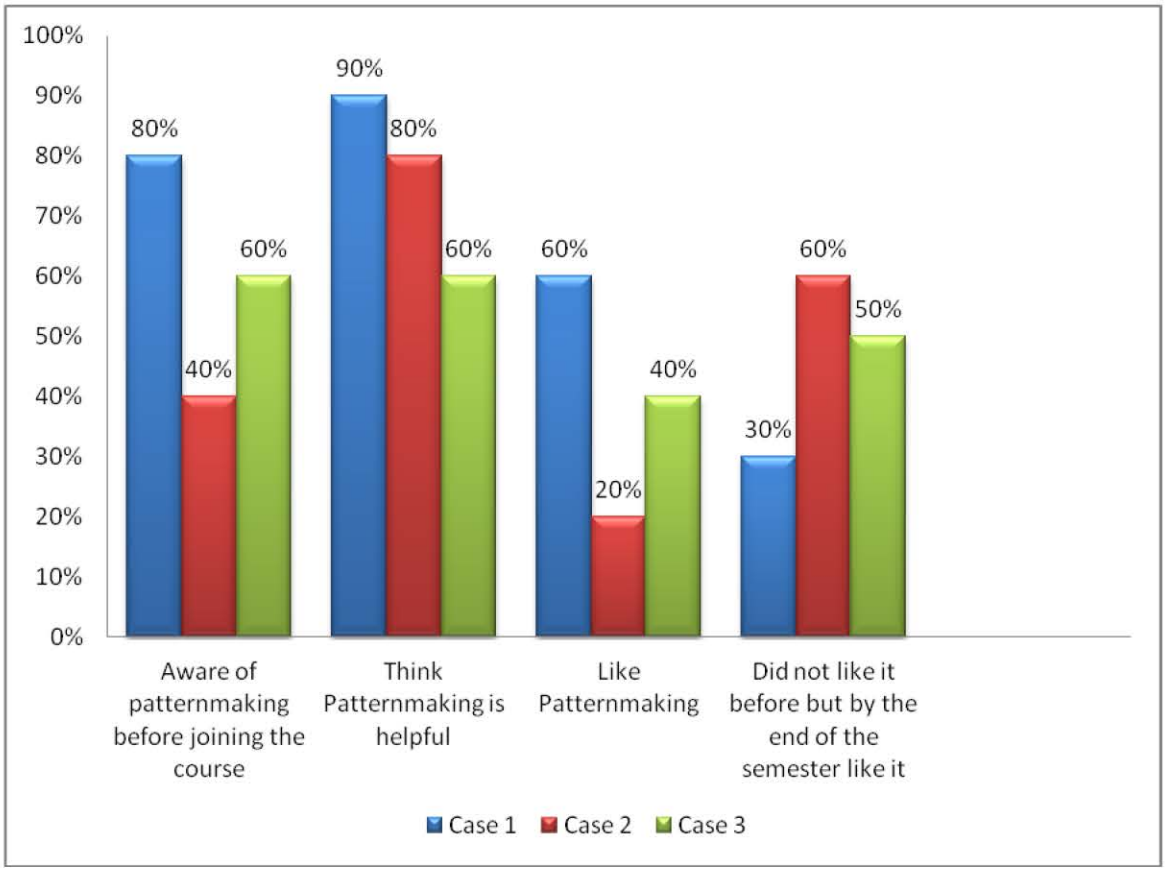


Figure 38 – Chart comparing the 3 cases. (Author, 2016)

When asked what it was about the subject that they did not like or found difficulty in, the majority of students in all cases stated that they did not enjoy and had problems with the calculations/math/numbers (50% in Case 1, 70% in Case 2 and 60% in Case 3), while 20% in Cases 1 and 2 and 30% in Case 3 said that they had trouble with style lines and figuring out where they fall on the body. 20% of the students from classes held in Mumbai (Cases 2 and 3) mentioned that they had problems with darts and quite often needed to be reminded of the importance of darts in adding shape and dimension to a garment. Below is a graph based on the difficulties that students had.

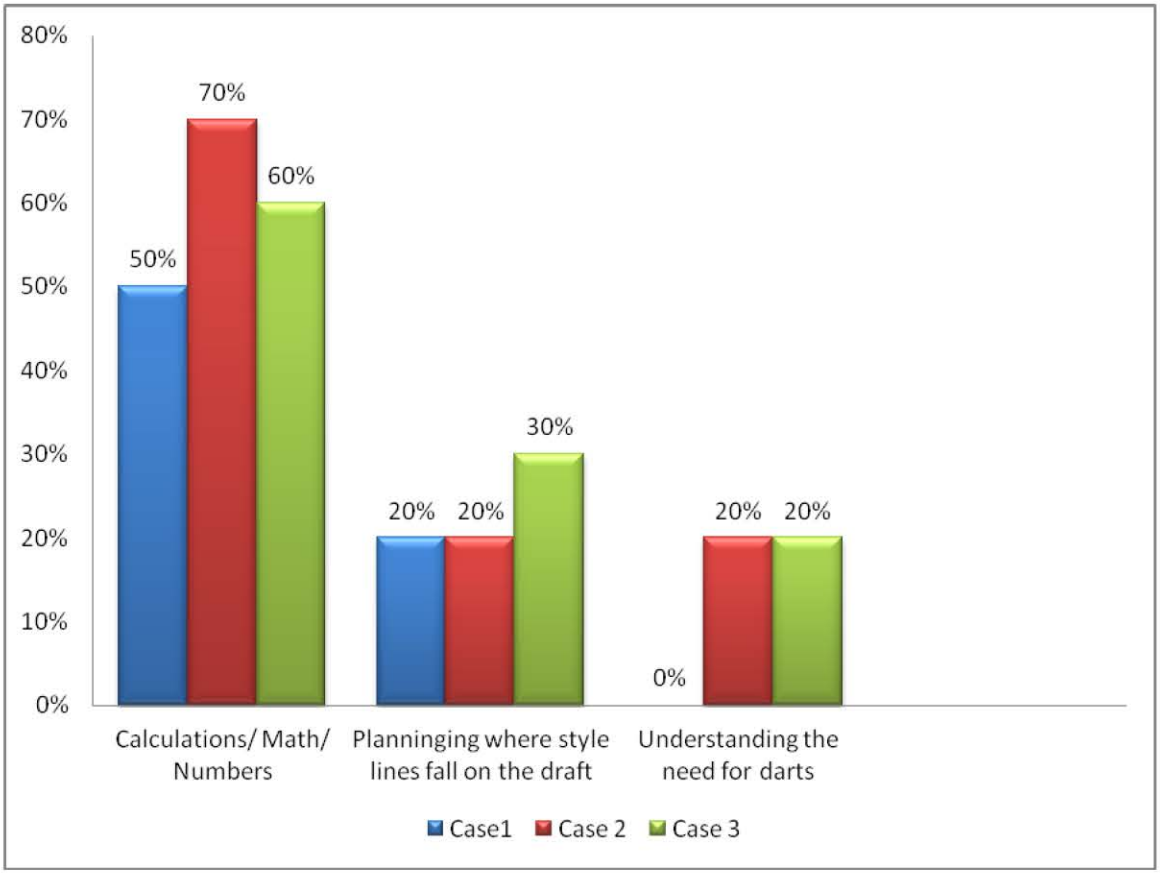


Figure 39 – Graph comparing students'opinions on patternmaking. (Author, 2016)

When students were asked what they liked about the subject and why they felt it was useful, the majority of students admitted that it was an accurate method; they felt that they were more sure of the final outcome and that it was neat. A few students mentioned that they enjoyed dart manipulation and adding and subtracting volume

and that the whole process seemed worth it when they finally saw their final garments. Students of Case 1 mentioned that they enjoyed working as a team and that they enjoyed presenting while playing the role of a teacher; these students also found that with every presentation they did, they gained more confidence and a few of the students from this case stated that they were "excited for the next semester because (they) feel more confident and ready to do more and (they) learnt a lot eventhough (they) thought it was going to be a difficult subject".

On being asked about their views about the overall conduct of the class and the teaching method, 80% of the class in Cases 1 and 3 and 20% in Case 2 stated that they were aware of the lesson plans and knew what they would be doing in the next class, they felt that the classes were well planed and organized while 20% of students from both Cases 1 and 2 stated that they wish that there were more instructions and help given because they felt that they were constantly following notes that were not discussed thoroughly and another 20% in both these cases stated that there was a slight lack of communication while 20% of the students in Case 2 and 30% of the students in Case 3 said that they required more time with their assignments.

Units of measurement were not in favour of Cases 2 or 3 as many students from Case 2 felt that converting centimeters from the notes they followed into inches was time consuming and confusing while students in Case 3 stated that while working in centimeters was fine in the class, although in the "outside world" (in India) tailors and almost everyone in the fashion industry works in inches.

3.5.2 | Teachers' Interviews

For this section, Professor from Case 1 = Lecturer 1, lecturer from Case 2 = Lecturer 2 and tutor from Case 3 = Lecturer 3.

Table 2 – Table comparing the teachers' interview answers. (Author, 2016)

Lecturers' Interview	**Lecturer 1**	**Lecturer 2**	**Lecturer 3**
Years spent teaching patternmaking	24 years	2 years	3.5 years
Most challenging part about teaching patternmaking	To get students to realize the relation between the body and the pattern	To make students interested in patternmaking	To help students realise that patternmaking is "not all math"
Observed students' difficulties	Students have difficulties understanding the relation between the body and pattern, translating their design into a flat pattern, try to rush the drafting process.	Students have difficulties figuring out where the style lines fall on the body and calculations and too much math are a problem too.	Students have difficulties with calculations and a long number of steps to follow, this makes them impatient and they don't enjoy the subject. They also have a problem imagining their design as numbers and flat lines.
Do you enjoy teaching patternmaking?	"Definitely!"	"Yes."	"I love it!"
Do you use the same method of teaching as you were taught with?	Used the same method at first, but changed it over the years.	No	Use a similar method, but not the same. (updated and modified version of the method)
Most efficient method	Combination of "Flipped classroom and collaborative learning" method	Method with the introduction of draping.	Method using notes with minimum instructions and using less "spoon feeding"

The lecturers from all three cases were interviewed. There was a big gap in the number of years of experience that each of them had, with Lecturer 1 having almost thirty one years of experience in teaching, out of which she had twenty four years of experience in teaching patternmaking, Lecturer 2 had two years of experience in teaching out of which both were spent teaching patternmaking, while Lecturer 3 had over five years of experience in teaching out of which over three years were spent teaching patternmaking. Both, Lecturer 2 and Lecturer 3 were millennials.

When asked what the most challenging part of teaching patternmaking was, Lecturer 1 stated that it was a challenge to get the students to understand the relation between the body and the pattern and "To make students understand that to design patterns is to draw the body, as the body dresses the garments that represented in the patterns. To design patterns is, thus, to understand the body." Lecturer 2 claimed that the most challenging part of teaching patternmaking is to get the students interested in the subject as "Students are scared and 'freak out' when they see calculations" and that they lose interest in the subjects because they think it is very technical. She also commented that many students question the importance of studying patternmaking when tailors are so easily available and most of them can "just get a tailor to make what we design". Lecturer 3 found it challenging to help students to realise that patternmaking is "not all math" and to try to help the students understand the importance of the subject as well as help them realise that patternmaking is not as difficult as they think it is and to try to get them to be more relaxed and enjoy the subject. Like Lecturer 2, Lecturer 3 also had students question the importance of learning patternmaking when later in their career tailors would be making their garments. (It should be noted that, in India, tailors are easily available and the cost of their labour is very cheap, in fact, it is cheaper to have a custom made garment by a tailor than it is to buy garments from stores. The cost of an evening gown with minimum embroidery and fabric included is as cheap as €30 in a city like Mumbai. Most students from Fashion Design courses in India have garments for their graduation collections and major projects made by tailors.)

When asked what they notice that students have difficulty with while learning patternmaking, Lecturer 1 noticed that other than having difficulty in understanding that "to design pattern is to draw the body", students have a difficulty in translating their design onto the basic pattern, they also try to rush the process and forget to pay

attention or "analyze the 'problem' thoroughly" and that they do not pay attention to garments that they wear, looking at details to understand how they are made. Lecturer 2 noticed that they have difficulty with understanding where the style lines fall on the body and also seem less motivated once they see all the calculations that they need to do. Lecturer 3 had a similar observation as Lecturer 3 and stated that "students see numbers or calculations and a list of steps to follow and panic and decide that it is a difficult subject. (…), (They) have a problem imagining their garments (that they have designed) as flat calculations".

Lecturers from all three cases said that patternmaking is a subject that they enjoy teaching, however Lecturers 2 and 3 admitted that it was not the subject that they expected that they would teach, Lecturer 3 stated that "It (patternmaking) wasn't a subject that I thought that I would ever teach, but once I started teaching it, I grew to love it with every semester, now it is even one of my hobbies"

When asked if the methods of teaching used by the lecturers was the same as the method they were taught with, Lecturer 1 replied that when she first started teaching (in 1992), the method was similar to that she was taught with, but "Through the years I changed the method (and keep changing it) so I can reach the students and make them appreciate Pattern Design almost as much as I do". She also says that she does not follow any particular system used by any institutes, but instead combines different systems to make it "it much easier for students to learn, understand and incorporate the theory and practice of Pattern Design." Lecturer 2 said that when she was taught patternmaking, they focused on flat patternmaking and were taught to follow notes and that draping was not encouraged and the method she uses in teaching patternmaking now is completely different as the college requires her to teach both flat patternmaking and draping as part of the Patternmaking subject and she has not changed her method since she started teaching. Lecturer 3 stated that she was taught patternmaking in 2005 by a relatively young teacher who was already very "modern in his way of conducting the class and his teaching methods" as a result, the method she uses is similar to that which she was taught with but she improves on it and modifies the method to better suit the students that she teaches. Both Lecturers 1 and 3 said that they change their methods or feel like they need to update it when they feel like they are not getting through to the students.

Lecturer 1 said that her most effective method of teaching was the method that she used in the class observed, which was a combination of “flipped classroom and collaborative learning” (where students were to teach the class how to draft certain patterns, while working in groups) that she has adopted because of the attitude of the current generation of students. Lecturer 2 stated that the introduction of draping in the patternmaking class was highly effective and students seem to understand shape and volume a lot better this way. Lecturer 3 said that the most effective method she has used is the one used to teach the classes observed because the notes that she provided the students with had a few steps and she “allowed the students to try to solve and understand notes themselves rather than ‘spoon feed’ them like I originally did when I first started teaching”

Lecturer 1 said that the most challenging part of the class that was observed was trying to make students understand the relation between the body and patterns and to understand how to translate their design on the basic pattern. Another challenge was trying to make students realize that they cannot rush the process and to pay attention to everyday clothes details. Lecturer 2 said that the challenging part of this class was that students took a long time to finalise their design and because they experimented with many shapes and looks in their final project, it was difficult to get them to stick to deadlines and ensure that they manage to submit completed work. Lecturer 3 said that the tight time schedule was challenging in this class and that she felt at times that she had to rush the students in order to meet deadlines.

Lecturer 1 states that she feels that she has succeeded in her job when she sees the fashion shows showcasing the students’ garments and realizes “what the students are capable of doing (in terms of patterns and construction).” Lecturer 2 and Lecturer 3 also had slightly similar replies, stating that they feel like they have succeed in getting through to the students when you see the students finished garments at the end of the semester.

3.5.3 | Observations

After interviewing students and lecturers, it was found that more students in Cases 1 and 2 felt that patternmaking was a helpful subject, although a few students from Case 2 claimed that "the subject is helpful but I will not use it after I graduate. I will get tailors to make all the clothes for me." In spite of knowing that patternmaking is an important subject, Case 2 had the least amount of students that like or enjoy patternmaking. Case 1 had the least amount of students that found calculations and math to be a problem and Case 3 had the most amount of students that found placing of style lines and turning their sketch into a flat pattern difficult, however, students in Case 2 used mostly draping to make patterns. Students from Cases 2 and 3 found it hard to understand why they needed to have a dart and tried as much as possible not to have them in their design, at the same time, they were the Cases where most students wanted well fitted garments that took the shape of the body. Later, after interviewing students about this, it was learned that they did not want to have a "random line" on the garment. Students in Cases 2 and 3 felt like they needed extra time for their assignments even though the total class hours of Case 2 were the highest and total class hours in Case 3 were more than that of Case 1 (However students in Case 3 had class 3 hours a day for 6 out of 7 days a week.) It was also found that lecturers from Case 1 and 3 updated their teaching methods and had more experience teaching patternmaking than the lecturer in Case 2. Also, the lecturer in Case 2 had the least amount of freedom while teaching when it came to the introduction of draping and the importance of flat patternmaking and the subject brief required her to introduce draping in this class. The professor in Case 1 had, by far, the most amount of teaching experience and had managed to update and modify her teaching methods over the years.

Case 1:

Students in this class gained more confidence after drafting by themselves and after each presentation. By the final project students were excited to experiment with more advanced styles. Many students from this case were found to have more

confidence while drafting than the other cases. The 'teach less' concept mentioned by Wilson and Gerber, (2008: 35) proved to be very efficient and students seemed attentive. "I was scared of the subject before but after we did the first presentation (reverse teaching) I started to become more confident".

The groups that students were working in consisted of about 5 to 6 members, which is not very easy to keep track of work distribution. When it comes to team assignments and projects, one must be careful about the 'free rider' or the members that do not contribute in the group as suggested by Wilson and Gerber (2008: 34).

Although there were very few students that said that they would have liked more instructions and directions from the professor, it should be noted that the professor was always present and available during class hours.

Case 2:

Students in this class gained more confidence in draping than in flat patternmaking. They preferred draping to flat patternmaking as they could avoid all the calculations and steps that they didn't like. For them, draping was faster and less "confusing" and they "did not have to take a lot of time trying to figure out where the style lines were to be placed."

Most of the students chose to drape their projects and as a result the students did not have much practice in flat patternmaking. Although students were given the chance to choose between the two kinds of patternmaking methods, some students that seemed to prefer flat patternmaking eventually gave in and switched to draping once they saw their classmates race past them in their project process. Many students also mentioned that they were not given a lesson plan for the class.

Although there were very few students that said that they would have liked more instructions and directions from the professor, it should be noted that the professor was always present and available during class hours. With reference to students' comments on needing more time with assignments, this case had the most amount of total class hours (84 hours which was double that of Case 1)

Case 3:

Students in this class gained more confidence after discussions and practice and seemed to gradually manage to work more independently and relied on the teacher less with each pattern they had to draft. By the final project students required very little help.

The classes were held over a short period of time and even though the number of classes were the most and class hours in total were a few hours more than Case 1, Having class everyday along with other subjects was tiring for students and all work had to be complete with class hours as the students did not have much time to work on projects out of class hours. Students also seemed more dependent on the lecturer in the first two assignments than those in Case1.

4 | Conclusion

4 | Conclusion

The lecturers from the cases observed had a common objective when grading their students based on their final project – they all wanted to see if the students had understood the concept of patternmaking and whether they could put into practice, what they had learnt in class. All lecturers felt that the teaching methods used in the classes observed were effective.

The hypothesis defined at the beginning of the study stated that the teaching/learning methods based on hands-on approaches are more efficient than those solely based on replicating the information passed on by lectures. However, it was observed that all cases had hands on approaches, some, more than the others did. Case 1 was found to have the most hands on approach with students working on most projects either individually or in groups to solve problems, and confidently convert their designs and ideas into garments through drafting as seen in their final project whereas Case 2 had the least hands on method and students had difficulties solving patternmaking related problems as well as with drafting patterns for garments they had designed in their final project and were not too confident while Case 3 was neutral and had a method that was less hands-on than Case 1 but more than Case 2 and students in this class were able to solve more patternmaking problems than Case 2 but less than Case 1 and in their final project the students were able to draft with confidence, although it was not as much as the students observed in Case 1. This observation makes us question, if all these cases used methods with a hands on approach, what else makes a difference in these methods of teaching?

Based on student behavior and interviews conducted, it was evident that students in Case 1 were more confident, independent and interested in patternmaking. Through the garments produced in their final project, it was clear that student in Case 1 enjoyed what they were doing and challenged themselves to create more complicated styles of pants and skirts and did not stick to the basic variations that they had learnt. From the garment styles and the fabrications students added it was clear to see that the students were not afraid of patternmaking as witnessed in the other two cases. It is possible that this is a result of the hands-on method adopted by the teacher in all assignments.

The introduction of collaborative learning in Case 1 was also helpful and as studied before, students "understand more easily the importance of working together toward a common goal" (Simões and Silva, 2016: 6). Millennials are known to work well as a team and are said to be skilled when it comes to collaborative effort and Strauss and Howe (in WILSON, GERBER , 2008: 31) confirm this by saying that "Millennials are developing strong team instincts and tighter peer bonds." Climer, (2013: 101) states that "working in the classroom is often more productive than working alone because it allows for group exchange and collaborative learning" . Since everyone is working on similar projects, it is helpful to work in a group as group members

members communicate with each other casually and share their experiences and methods of doing a certain task. Students tend to learn faster from each other's mistakes and even from their positive experiences.

Another area that can be questioned is the experience of the teachers. While the professor in Case 1 had the most amount of experience and it is possible that having many years of experience allowed the teacher in Case 1 to make changes and updates in teaching methods along with an observation of the change in behavior of students as the students first taught by her were not millennials. However, the teacher in Case 2 had just a year less of experience than the teacher in Case 3, yet more changes and updates of methods were made by the professor in Case 3 and students in this case were also seen to have performed better than Case 2. We cannot be certain that a method was more efficient just because the teacher was more experienced but can state that imporoving and modifying teaching methods is beneficial for the students. Ashdown (2013) states that millennials naturally learn better with methods modified to fit their generation. Methods today need to project patternmaking as a subject that provides skill and has the value they need for their goals and it needs to be portrayed as an exciting and creative subject. Ashdown further goes on to say that students do not want to be lectured to all the time.

Based on the teachers' personalities and behavior, although teachers in all cases had a casual relation with the students in, teachers in Case 1 and Case 2 were seen as more enthusiastic and were constantly moving around the class and interacting with students. Students in this class were seen to have similar attitudes as their teachers towards patternmaking and seemed more confident while drafting, even if developed later in the semester. The teacher in Case 2 did not seem very enthusiastic or convincing while teaching the subject and students in this case were also not very motivated or confident while drafting. Wilson and Gerber (2008) confirm that the attitude of teachers is important and that millennials respond best to external motivators.

In their study, Wilson and Gerber (2008: 32) encourage educators to "strive for greater clarity in course structure, assignments and grading expectations." They suggest that educators submit course syllabi and pacing guides at the beginning of each semester. This was visible in the Case 1 and Case 2 and it was found that both cases were well managed in terms of time, but unfortunately this was not what happened in Case 2 where students were not sure of their next project or the grading structure and although it was the case with the most amount of work hours, the time was not managed well.

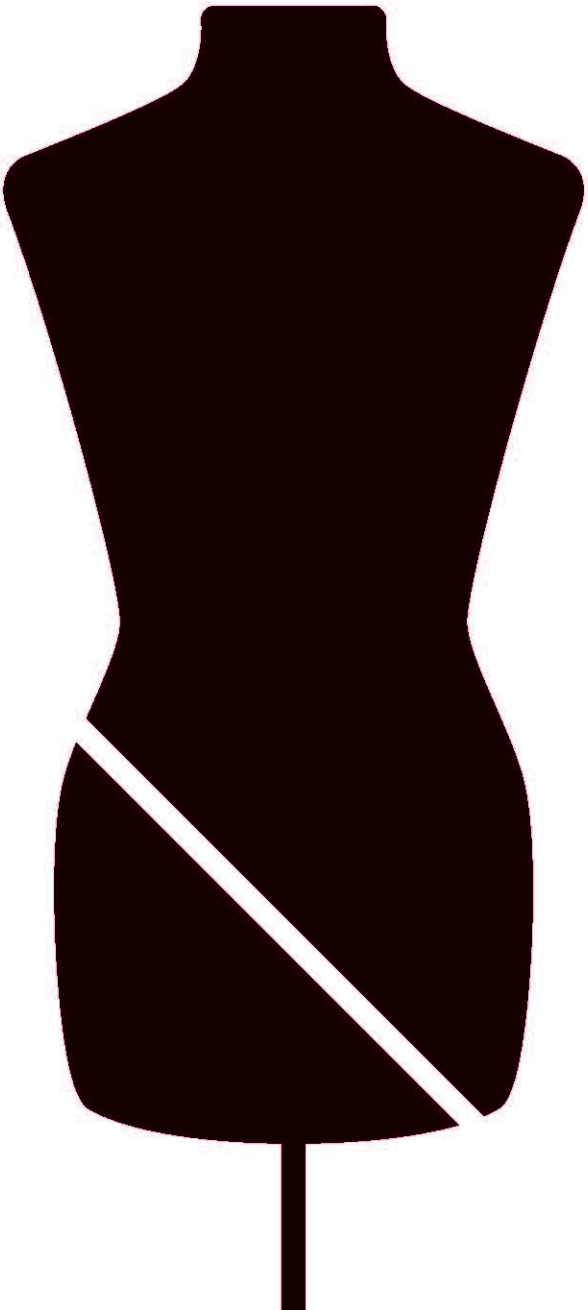
Based on the total amount of class hours the students had and the amount of work done, it is a draw between Case 1 and Case 3. Although students had managed to draft 2 sets of basic blocks individually, variations of both sets of blocks (each group was allotted a type of variation and did not have to draft all variations per block) with two presentations while working in groups and a project where they had to draft and make 3 garments for the lower body individually with 42 hours of total class time over a span of 3 months, the students in Case 3 worked individually on all projects to draft two sets of blocks (and a sleeve block), variations of the blocks in miniature (students worked individually to draft all the variations shown to them), and a project where they had to draft and produce a toile of a garment using the blocks they had drafted with 48hours of total class time over a span of 16 days.

Based on the students' dependence on the teacher and ability to work independently, although most students in Case 2 were not as dependent on their lecturer as most in Case 3, majority of the students in Case 1 were far ahead and worked well independently (in terms of student-teacher dependency) in class and although they asked for a minimum amount of help, they managed to do most of the drafts using the notes provided and discussing amongst themselves, with the teacher present in class.

Thus we can conclude, that the combination of reverse-teaching and collaborative learning method used in teaching patternmaking in Case 1 was the most efficient of all 3 cases.

"Whatever happens in the future,
our task as teachers is not to 'download'
a set curriculum of information to students,
but to understand, engage and guide our
students to their future.
Understanding this will keep our
attention and our efforts focused
on the needs of the students as they change."

ASHDOWN, 2013: 119



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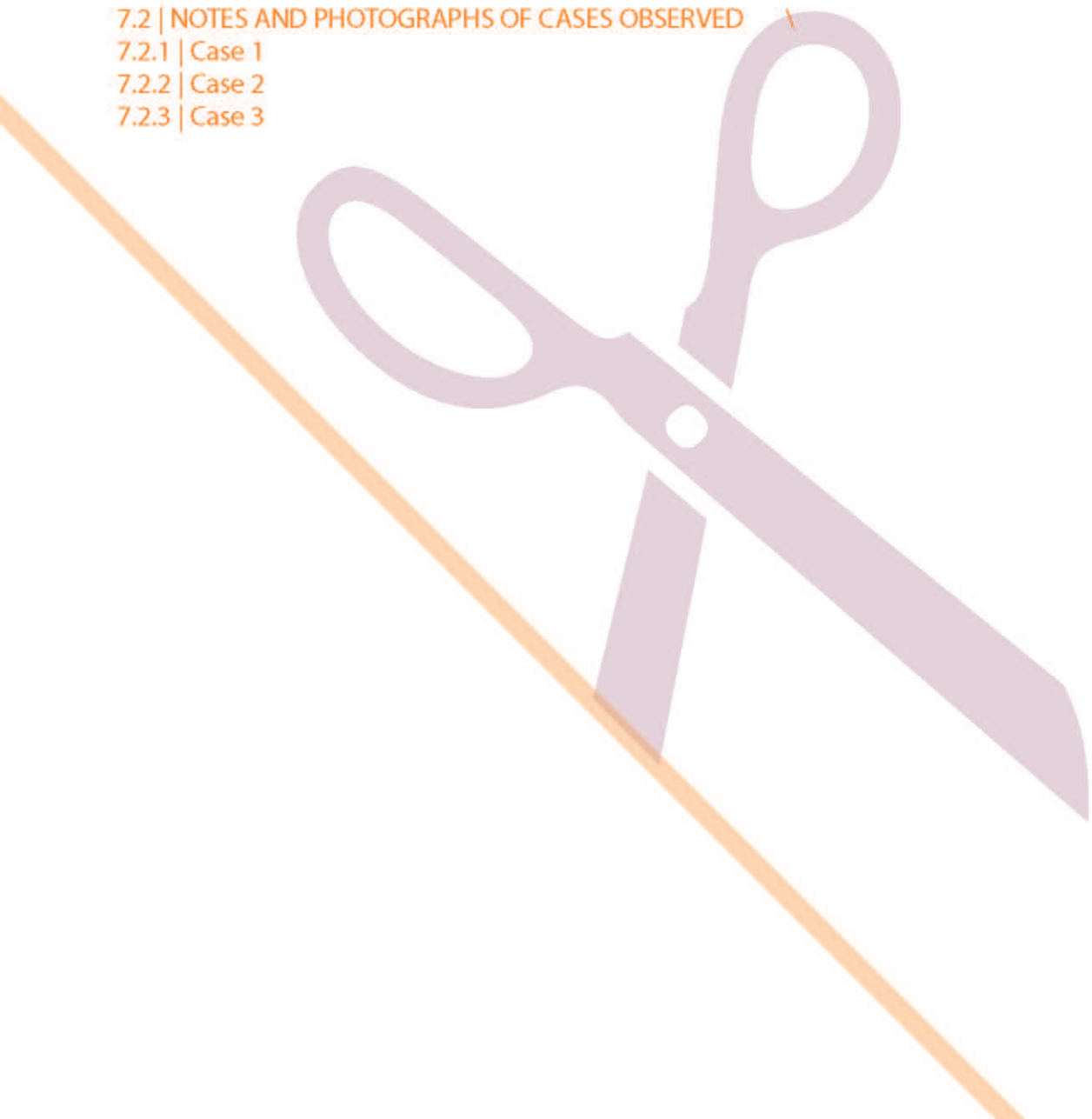
7 | Appendix



7 | APPENDIX

7.1 | INTERVIEWS

Interviews of students and lecturers that have been cited in the thesis are listed below.

7.1.1 | Students' Interviews:

Case 1:

Student 1:

1) What is your opinion about patternmaking?

   In the beginning I was scared of the subject, but after we had our first thesis I started to become more confident.

2) Did you know about patternmaking before joining the course?

   Yes.

3) Do you feel patternmaking is helpful?

   Yes it is very helpful because without patternmaking we would not have a good fit of the garment. We need it when we have our fashion show and I can also make clothes for myself or my sister with the blocks.

4) What did you like about the patternmaking classes?

   The presentation because it helped me become confident and also working in the group helped me make new friends and also get closer to friends I knew before. We taught each other when someone could not understand. I liked the final project and was excited to try to make different pants and skirts.

5) What did you not like about this patternmaking class?

There were many calculations and steps and I got a bit confuse while drafting the blocks but after some time I understood it.

6) What was the easiest part of the subject?

After we had the blocks the rest was easy because our notes were clear so we just followed them.

7) What did you find difficult in the subject?

Drafting the basic blocks.

8) What is your opinion on the classes?

We were given a plan of the semester so we knew what we had to do and we had all the notes sent to us before class so we could read and plan before getting to class. Not all our classes are like this. This class was well organised.

Student 2:

1) What is your opinion about patternmaking?

I like patternmaking eventhough some parts are complicated.

2) Did you know about patternmaking before joining the course?

Yes

3) Do you feel patternmaking is helpful?

Yes. It helps us work in an organized way and we need it later when we are designers to know if what we design will work or not.

4) What did you like about the patternmaking classes?

I liked the working in a group because when we were drafting we were teaching each other and in the presentation we had support and help from the group members.

5) What did you not like about this patternmaking class?

I am not very comfortable in presentations so I didn't like that part.

6) What was the easiest part of the subject?

   Making the patterns for the skirts and pants after we had the blocks.

7) What did you find difficult in the subject?

   The presentation because I don't like to talk in front of the class.

8) What is your opinion on the classes?

   I think we did many things (many assignments) and it did not feel like there was too much work because the class was planned well, we had a plan of the class in the beginning of the semester. I'm excited for the next semester. I feel more confident while making patterns and want to do more (make more patterns) I learnt a lot. I thought it was a difficult subject before.

Case 2

Student 1:

1) What is your opinion about patternmaking?

   I prefer draping to flat patternmaking. With draping I don't have to take a lot of time to figure out where style lines are placed. And there are no calculations and long steps.

2) Did you know about patternmaking before joining the course?

   Yes, but not in detail, I just had a rough idea of what it was.

3) Do you feel patternmaking is helpful?

   Yes, because even if it is not me making the garment, I need to know how it is made.

4) What did you like about the patternmaking classes?

I think with patternmaking we can be more sure of the outcome and it is more accurate.

5) What did you not like about this patternmaking class?

   The math and calculations.

6) What was the easiest part of the subject?

   Being able to drape.

7) What did you find difficult in the subject?

   The calculations. It was too technical and it didn't help that we had to convert centimeters to inches while drafting.

8) What is your opinion on the classes?

   I think its good that we are given the freedom to choose between draping and drafting but the class should cover more of patternmaking, our basics need to be stronger and we need more time for our assignments.

Student 2:

1) What is your opinion about patternmaking?

   I don't like drafting much. I prefer draping.

2) Did you know about patternmaking before joining the course?

   Yes.

3) Do you feel patternmaking is helpful?

   I don't think it is important for me because I will probably not use it after my course, I will get tailors to make the clothes for me.

4) What did you like about the patternmaking classes?

   I think it helps us understand the shape of the body and it is more precise.

5) What did you not like about this patternmaking class?

The math and calculations.

6) What was the easiest part of the subject?

Draping was easy because it was faster and we could see the shape and make changes immediately.

7) What did you find difficult in the subject?

Math and calculations.

8) What is your opinion on the classes?

The timing of projects was not well allotted.

Case 3

Student 1:

1) What is your opinion about patternmaking?

At first I thought patternmaking was difficult, but after the first few assignments I understood it better.

2) Did you know about patternmaking before joining the course?

No.

3) Do you feel patternmaking is helpful?

Yes, I feel it is helpful because sometimes the tailors don't understand or know how to make some designs and we need to know this to explain it to them.

4) What did you like about the patternmaking classes?

I liked making the variations of skirts and tops and I had fun adding and taking away volume. I liked the final project and could see where I had added volume and the effect it had on the shape of the skirt.

5) What did you not like about this patternmaking class?

It was a very intensive course and sometimes we did not have time to go home and work on our project or assignment.

6) What was the easiest part of the subject?

Transforming the blocks in different garments.

7) What did you find difficult in the subject?

Trying to draft the first block.

8) What is your opinion on the classes?

I think it was well organized and that we managed to do a lot in a little time. I didn't think I could have learnt so much in less than three weeks. I feel that I learnt a lot and it is important to have learnt the basics well.

Student 2:

1) What is your opinion about patternmaking?

I think it is a bit confusing but with practice it gets easier.

2) Did you know about patternmaking before joining the course?

Yes. My parents own a garment factory so we have a few patternmakers.

3) Do you feel patternmaking is helpful?

I think it is important, but at the same time it won't be very helpful for me because I plan on joining the family business.

4) What did you like about the patternmaking classes?

I liked drafting the circular skirt and I liked working on the final project.

5) What did you not like about this patternmaking class?

I think we didn't have a break from the subject except for Saturdays and it was a bit tiring but we learned a lot in that time.

6) What was the easiest part of the subject?

Once the basic blocks were done, the rest was not that difficult. Learning on the miniatures made it easier. By the time I had to draft the final project I was a lot more confident and I thought it would be difficult but once I started, I didn't want to stop.

7) What did you find difficult in the subject?

Drafting the basic block in the beginning was a bit difficult.

8) What is your opinion on the classes?

7.1.2 | Teachers' Interviews:

Case 1

1. How long have you been teaching for?
   Courses like Pattern Design and Draping, since 1992. From 1985 to 1987, I taught Descriptive Geometry and from 1987 to 1989 Basic Design, Figure Drawing

2. Were you teaching patternmaking for all that time? If not, how long have you been teaching patternmaking for?
   -

3. What is the most challenging part about teaching patternmaking?
   To make students understand that to design patterns is to draw the body, as the body dresses the garments that represented in the patterns. To design patterns is, thus, to understand the body, which is something that I consider attainable as

long as students recognize they have a body and that they are experienced as a dressed body.

4. What do you notice that students have difficulty with?
   First, what I described above. Secondly the process of plotting the style of the 'future' garment on the basic pattern; really, to be calm and systematic, to not jump into the result without having paid attention to the process (to not understand that designing first patterns requires a slow pace), to not analyze the 'problem' thoroughly, to not look at the clothes they by and dress in detail.

5. Is patternmaking a subject you enjoy teaching? Has it always been like that?
   Definitely!

6. Is your method of teaching the same as or close to what you were taught with? If no, how is it different?
   When I started teaching Pattern Design in 1992, it was very similar to the method I was taught with. Through the years I changed the method (and keep changing it) so I can reach the students and make them appreciate Pattern Design almost as much as I do. I don't follow a particular system, adopted by another education institution (foreigner or national), I combine various systems, as I am sure that this eclectic approach makes it much easier for students to learn, understand and incorporate the theory and practice of Pattern Design.

7. Have you used the same method of teaching since you first started?
   Same answer as 6

8. If you change, why? When do you feel like you need to change your method?
   I don't really know. When I grasp that I'm not reaching the students…

9. What, till today can you say has been your most effective method?

I think that the combination of flipped classroom and collaborative learning is, now, a very effective combined method. But the reason why I started to adopt this method has to do with the current generation of students, their intrinsic nature and attitude towards life. Back in the 1990s, students were different, closer to what my generation was when we were growing up…

10. What has been the most challenging part of this class?

Same answer as to question 5.

11. What do you feel was the most effective part? Do you feel that you succeeded in getting through to the students?

When I see the DEMO shows, what the students are capable of doing (in terms of patterns and construction) I get amazed at their capability and skills! So I think that, somehow, I succeeded in my job, particularly considering that I was with them only for two semesters out of six (which corresponds to three plus three hours per week in a total of 14 plus 14 weeks).

Case2:

1. How long have you been teaching for?

   2 years

2. Were you teaching patternmaking for all that time? If not, how long have you been teaching patternmaking for?

   Yes

3. What is the most challenging part about teaching patternmaking?

Students don't see the importance of the subject. They are scared and freak out when they see calculations. They lose interest and do not enjoy the class. Many of them want to know why they need to learn patternmaking when a tailor will do it for them.

4. What do you notice that students have difficulty with?

   Calculations put them off and they don't understand and have difficulties figuring out where style lines fall on the body.

5. Is patternmaking a subject you enjoy teaching? Has it always been like that?

   Yes, I always liked patternmaking.

6. Is your method of teaching the same as or close to what you were taught with? If no, how is it different?

   No, it is not the same. We were taught to follow notes and draping was not encouraged. In this class we give the students the freedom to drape or draft.

7. Have you used the same method of teaching since you first started?

   Yes, it was one of the college's rules.

8. If you change, why? When do you feel like you need to change your method?

-

9. What, till today can you say has been your most effective method?

I think the introduction of draping was effective. The students have been enjoying it more than drafting which is ok because the course gives them a chance to experiment with both and use what they are comfortable with. They seem to understand shape and volume better with this method.

10. What has been the most challenging part of this class?

Students take a long time to figure out and finalise their designs and I think getting them to meet deadlines was challenging.

11. What do you feel was the most effective part? Do you feel that you succeeded in getting through to the students?

Introducing draping was very effective. After seeing their finished garments and also their progress I feel I was successful.

Case 3:

1. How long have you been teaching for?

   5 years

2. Were you teaching patternmaking for all that time? If not, how long have you been teaching patternmaking for?

   3 and a half years teaching Women's Wear drafting along with Draping, Costume History, Design and Research and Fashion Illustration. 2 years teaching Art in schools.

3. What is the most challenging part about teaching patternmaking?

   To help students realise the importance of patternmaking and that it is not all math and is not as difficult as they think it is if they have patience with the process. It is tricky to get them to enjoy and have fun with the subject.

4. What do you notice that students have difficulty with?

   Students see calculations and a long list of steps that they have to follow and they decide that it is a difficult subject. They have a difficulty imagining the garment they have designed as a set of lines and calculations.

5. Is patternmaking a subject you enjoy teaching? Has it always been like that?

   Yes, but it wasn't a subject I thought I'd teach but once I started teaching it, I grew to love it and have fun teaching it every semester. It is even one of my hobbies.

6. Is your method of teaching the same as or close to what you were taught with? If no, how is it different?

   I was taught patternmaking in 2005 by a relatively young teacher. He was very modern in his teaching methods and way of conducting the class quite unlike the much older teachers we had teaching us and he always managed to get us, millennials, interested in the subject. So when I first started teaching I started with his method of teaching and gradually updated it to better suit the students.

7. Have you used the same method of teaching since you first started?

The method I use now is an updated version of what I first used when I started teaching.

8. If you change, why? When do you feel like you need to change your method?

   I feel like I need to change or improve on my method when I see that I am not getting through to the students and if I'm tutoring then I change my method according to the college the student is and the size of the class.

9. What, till today can you say has been your most effective method? And least effective?

The most effective method, for me, is the one used in this class as I allowed the students to try to solve the steps for the notes mostly themselves rather than "spoon-feed" them like I did before. Using notes that had few instructions helped a lot.

10. What has been the most challenging part of this class?

The tight time schedule made me feel like I was rushing the students at times in order to meet deadlines.

11. What do you feel was the most effective part? Do you feel that you succeeded in getting through to the students?

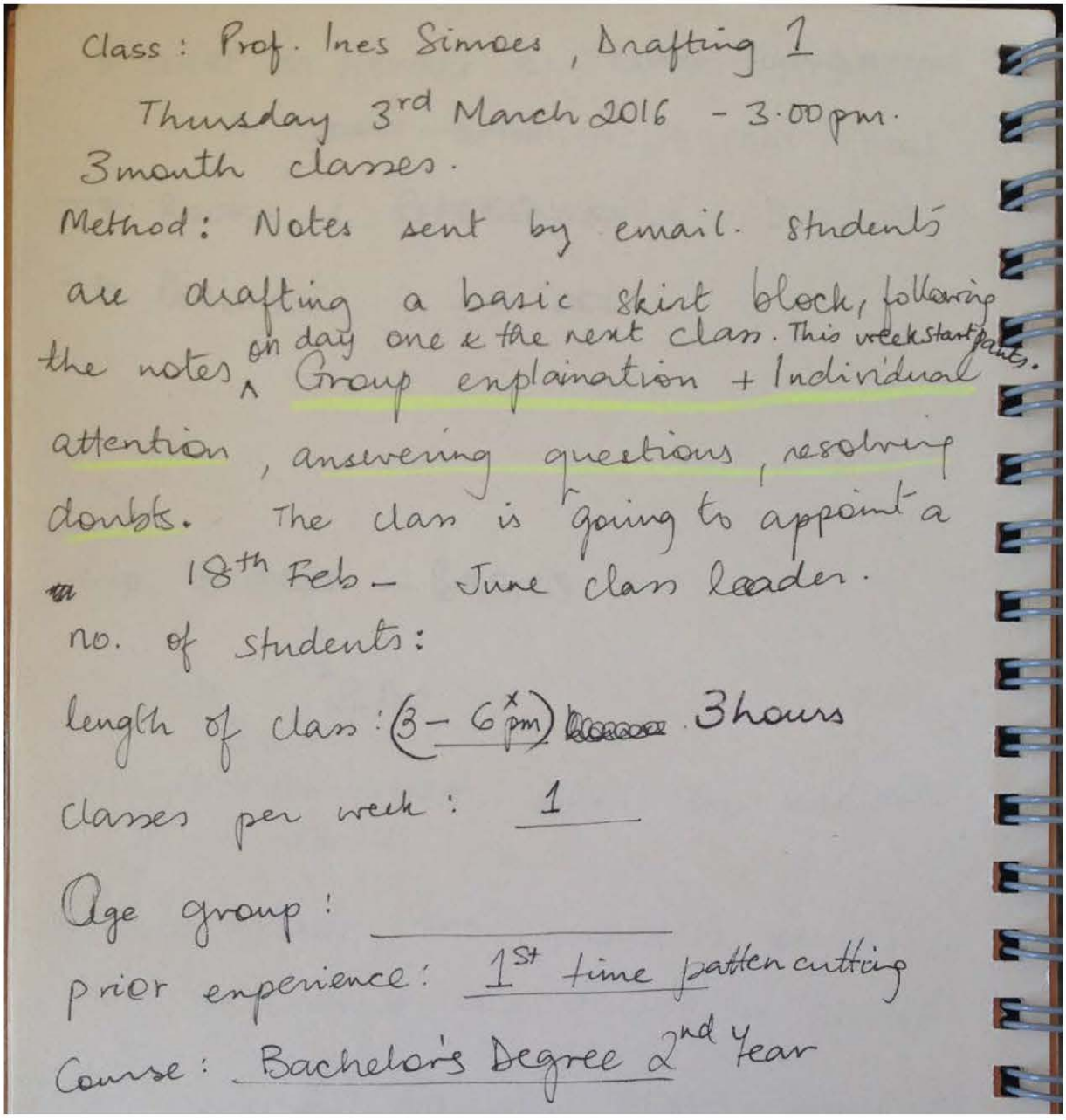
The effective part was using notes that had minimum instructions and getting students to write their own steps while discussing it in class. I feel that I succeeded , especially once I saw their submissions for the final project.

7.2 | NOTES AND PHOTOGRAPHS OF CASES OBSERVED

Some images of notes and photographs taken while observing classes.

7.2.1 | Case 1

Notes:


Class : Prof. Ines Simoes, Drafting 1

Thursday 3rd March 2016 - 3.00pm.

3month classes.

Method: Notes sent by email. students are drafting a basic skirt block, following the notes on day one & the next class. This week start parts. Group explaination + Individual attention, answering questions, resolving doubts. The class is going to appoint a 18th Feb – June class leader.

no. of students:

length of class: (3 – 6pm) 3hours

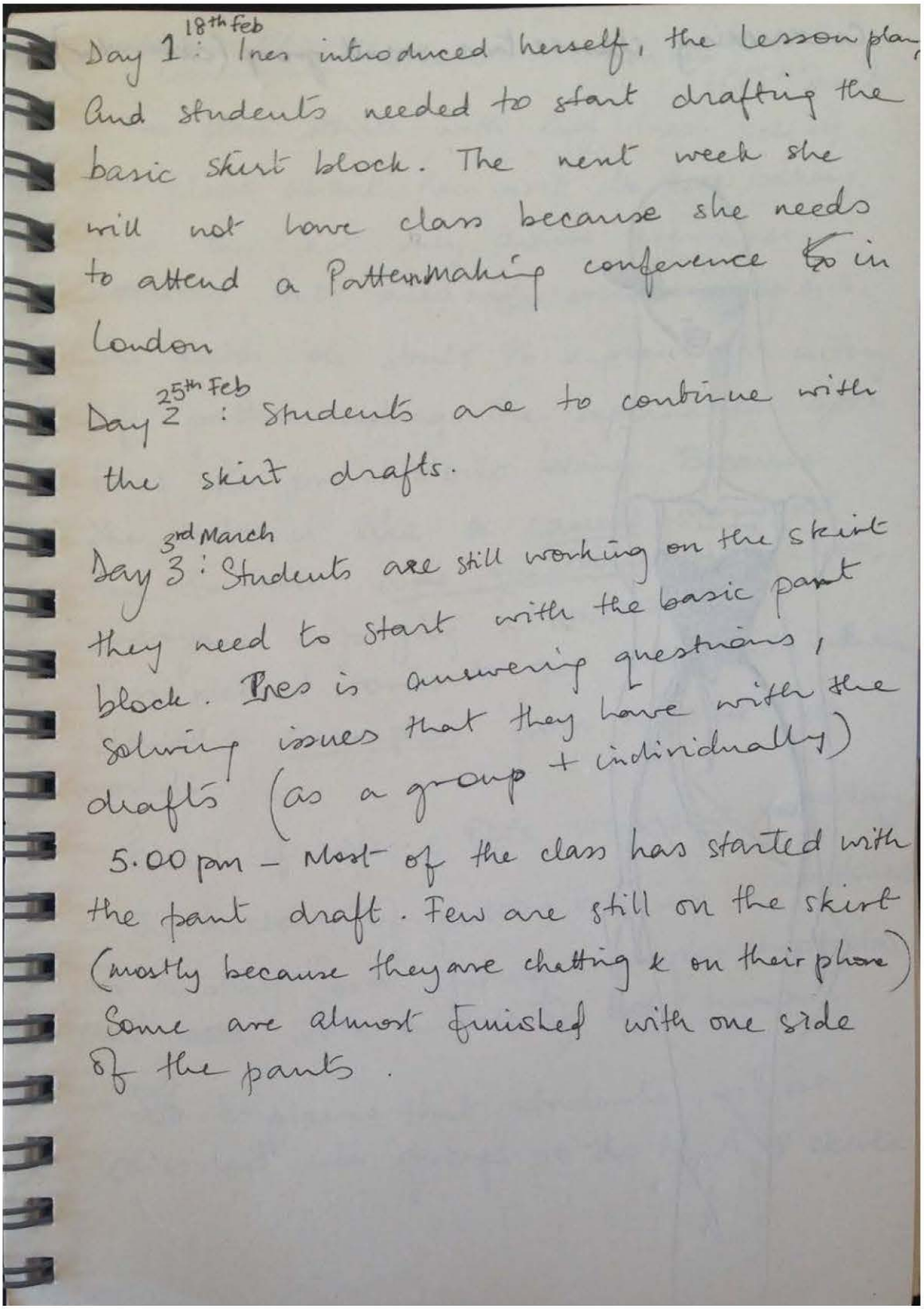
classes per week: 1

Age group:

prior experience: 1st time pattern cutting

Course: Bachelor's Degree 2nd Year

Figure 40 - Photo of notes taken during class observations. (Author, 2016)

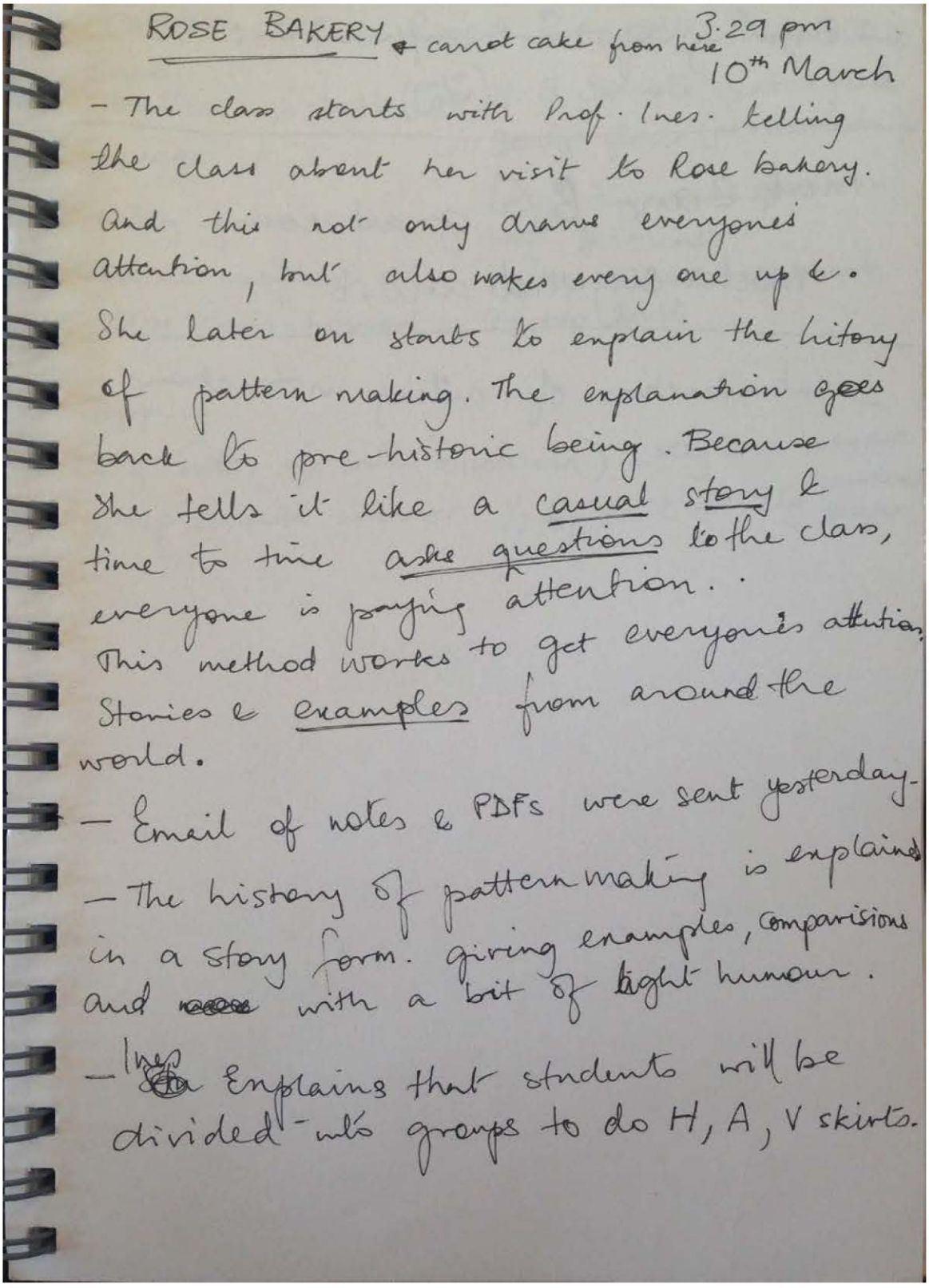

Day 1 : 18th Feb Ines introduced herself, the lesson plan And students needed to start drafting the basic skirt block. The next week she will not have class because she needs to attend a Pattern Making conference ~~to~~ in London

Day 2 : 25th Feb Students are to continue with the skirt drafts.

Day 3 : 3rd March Students are still working on the skirt they need to start with the basic pant block. Ines is answering questions, solving issues that they have with the drafts (as a group + individually)

5.00 pm – Most of the class has started with the pant draft. Few are still on the skirt (mostly because they are chatting & on their phone) Some are almost finished with one side of the pants.

Figure 41 - - Photo of notes taken during class observations. (Author, 2016)


ROSE BAKERY ← carrot cake from here 3.29 pm
10th March

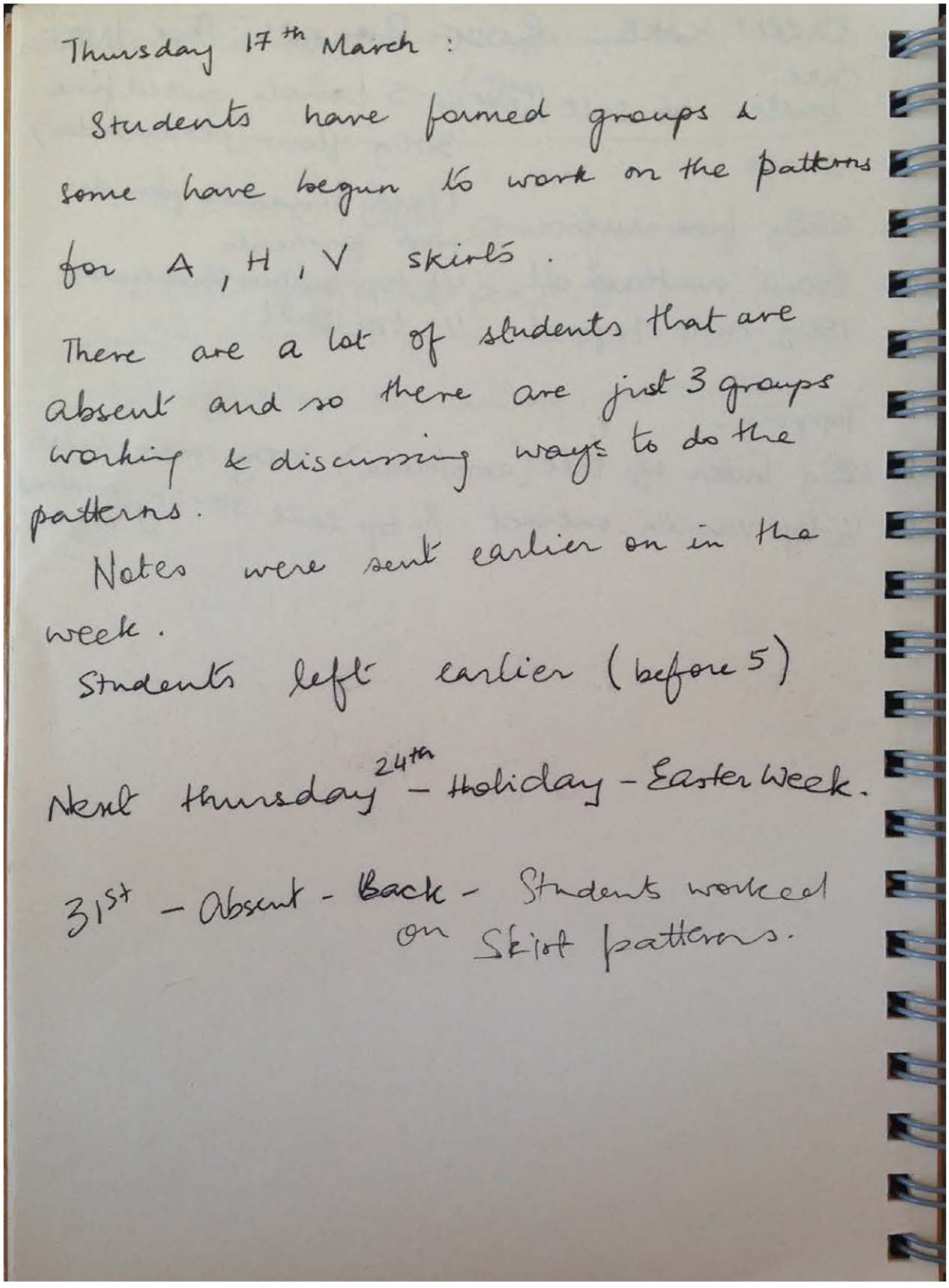
- The class starts with Prof. Ines. telling the class about her visit to Rose Bakery. And this not only draws everyones attention, but also wakes every one up &. She later on starts to explain the history of pattern making. The explanation goes back to pre-historic being. Because she tells it like a casual story & time to time asks questions to the class, everyone is paying attention.. This method works to get everyones attention. Stories & examples from around the world.

- Email of notes & PDFs were sent yesterday.

- The history of pattern making is explained in a story form. giving examples, comparisions and with a bit of light humour.

- Ines explains that students will be divided into groups to do H, A, V skirts.

Figure 42 - Photo of notes taken during class observations. (Author, 2016)


Thursday 17th March :

Students have formed groups & some have begun to work on the patterns for A, H, V skirts.

There are a lot of students that are absent and so there are just 3 groups working & discussing ways to do the patterns.

Notes were sent earlier on in the week.

Students left earlier (before 5)

Next thursday 24th - Holiday - Easter Week.

31st - Absent - Back - Students worked on Skirt patterns.

Figure 43 - Photo of notes taken during class observations. (Author, 2016)

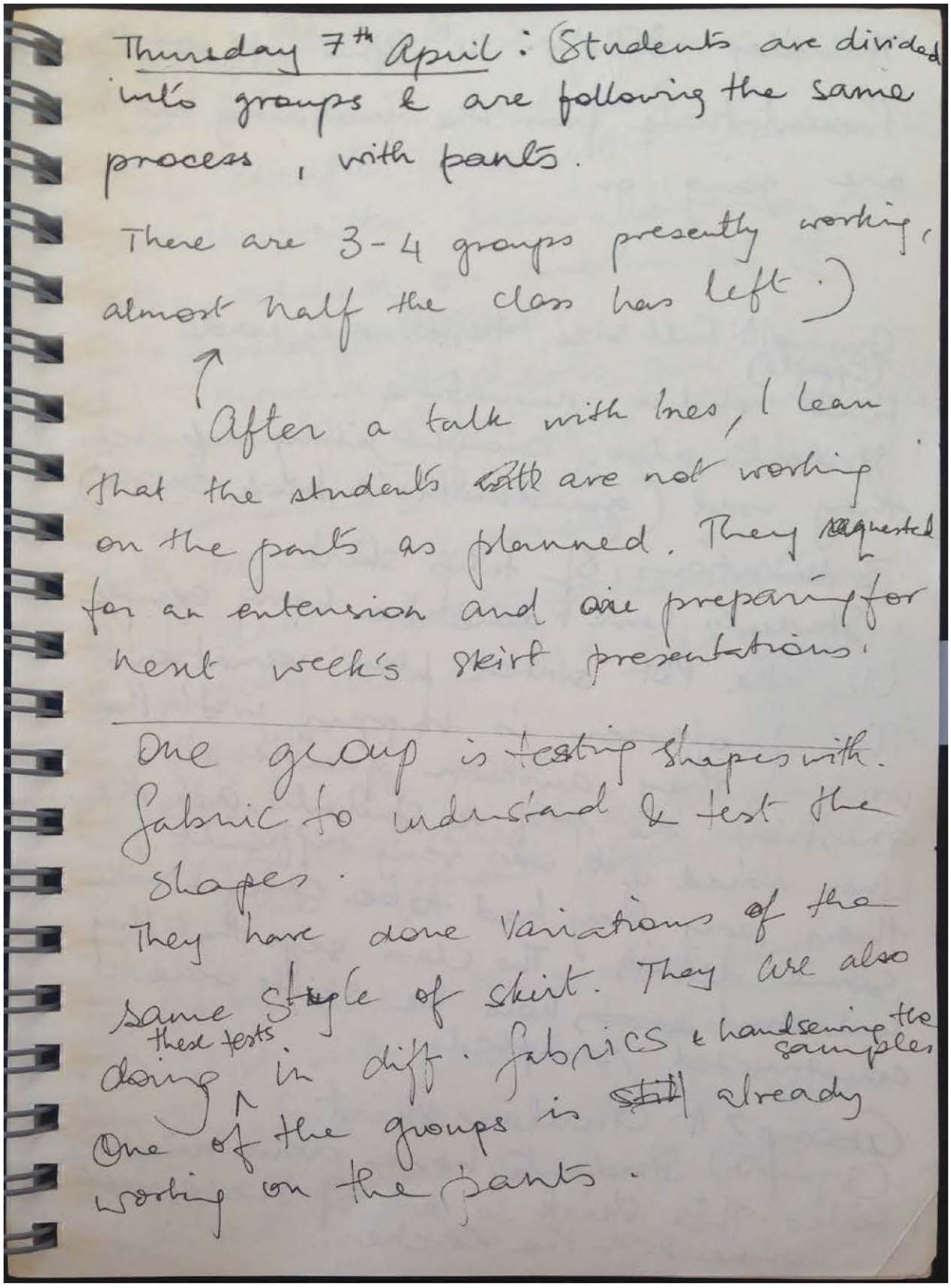
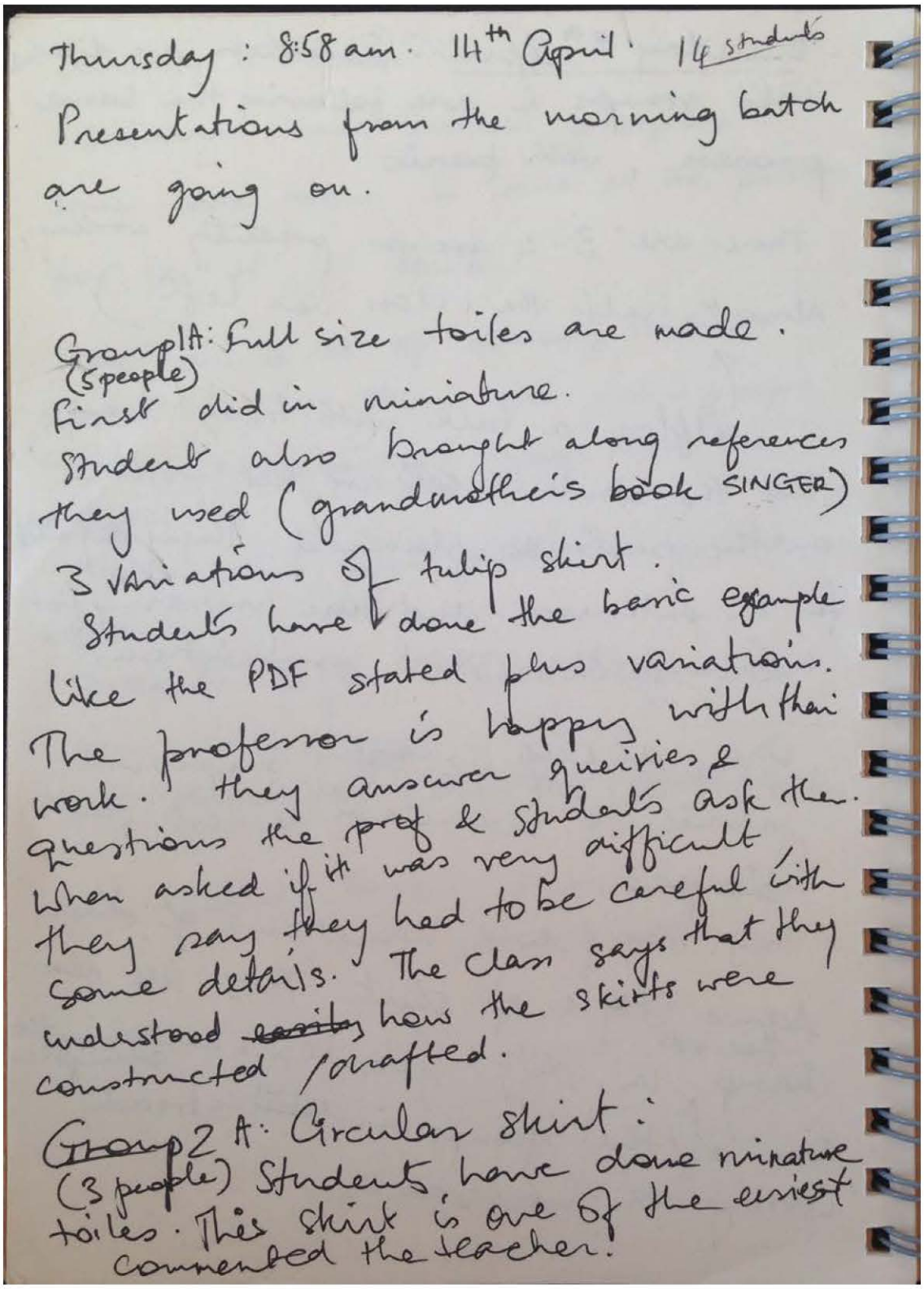


Figure 44 - Photo of notes taken during class observations. (Author, 2016)


Thursday : 8:58 am. 14th April. 14 students
Presentations from the morning batch are going on.

Group 1 A: Full size toiles are made. (5 people)
First did in miniature.
Student also brought along references they used (grandmother's book SINGER)
3 variations of tulip skirt.
Students have done the basic example like the PDF stated plus variations.
The professor is happy with their work. they answer queiries & questions the prof & students ask them.
When asked if it was very difficult they say they had to be careful with some details. The class says that they understood ~~easily~~ how the skirts were constructed / drafted.

Group 2 A: Circular skirt:
(3 people) Students have done miniature toiles. This skirt is one of the easiest commented the teacher.

Figure 45 - Photo of notes taken during class observations. (Author, 2016)

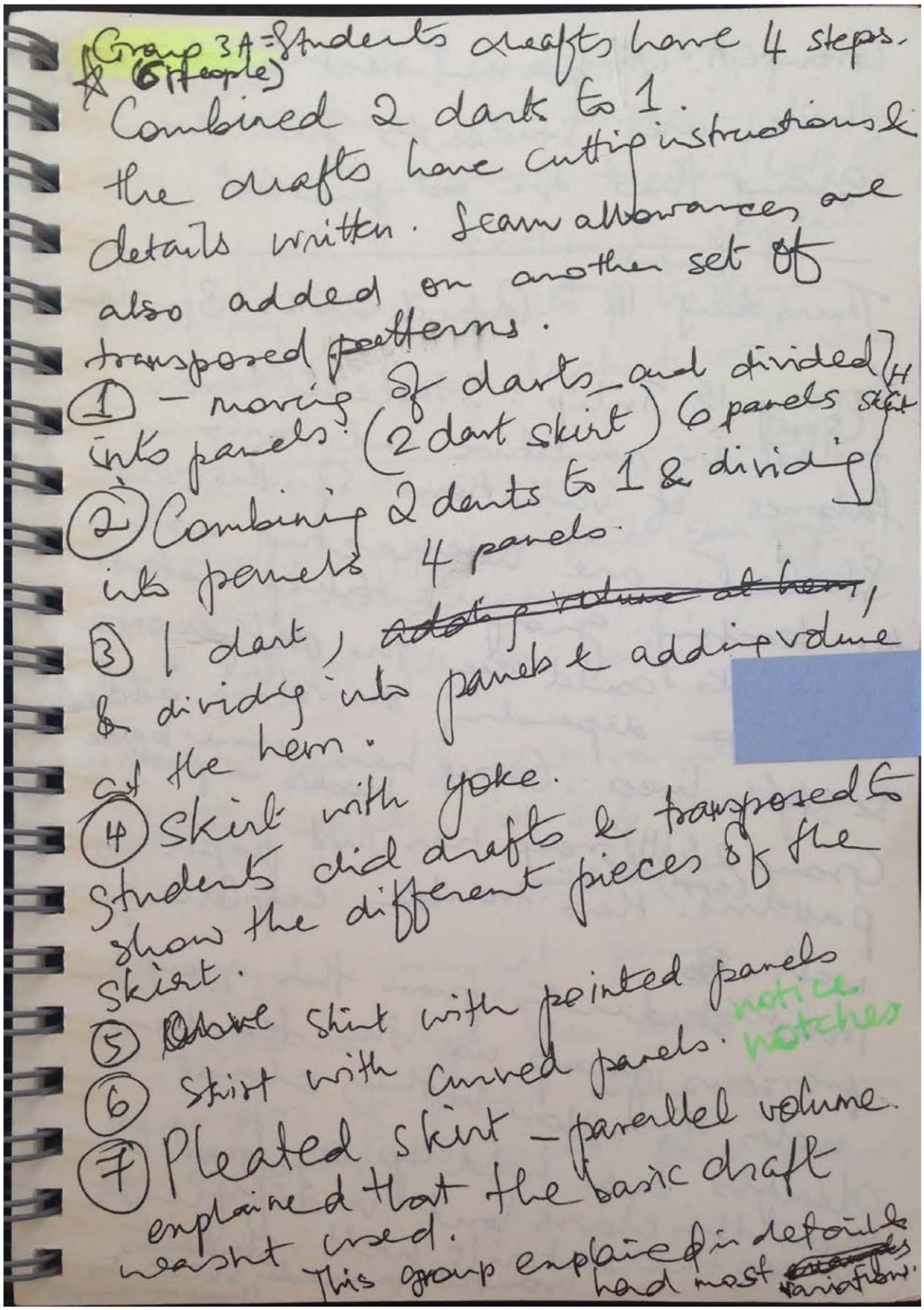
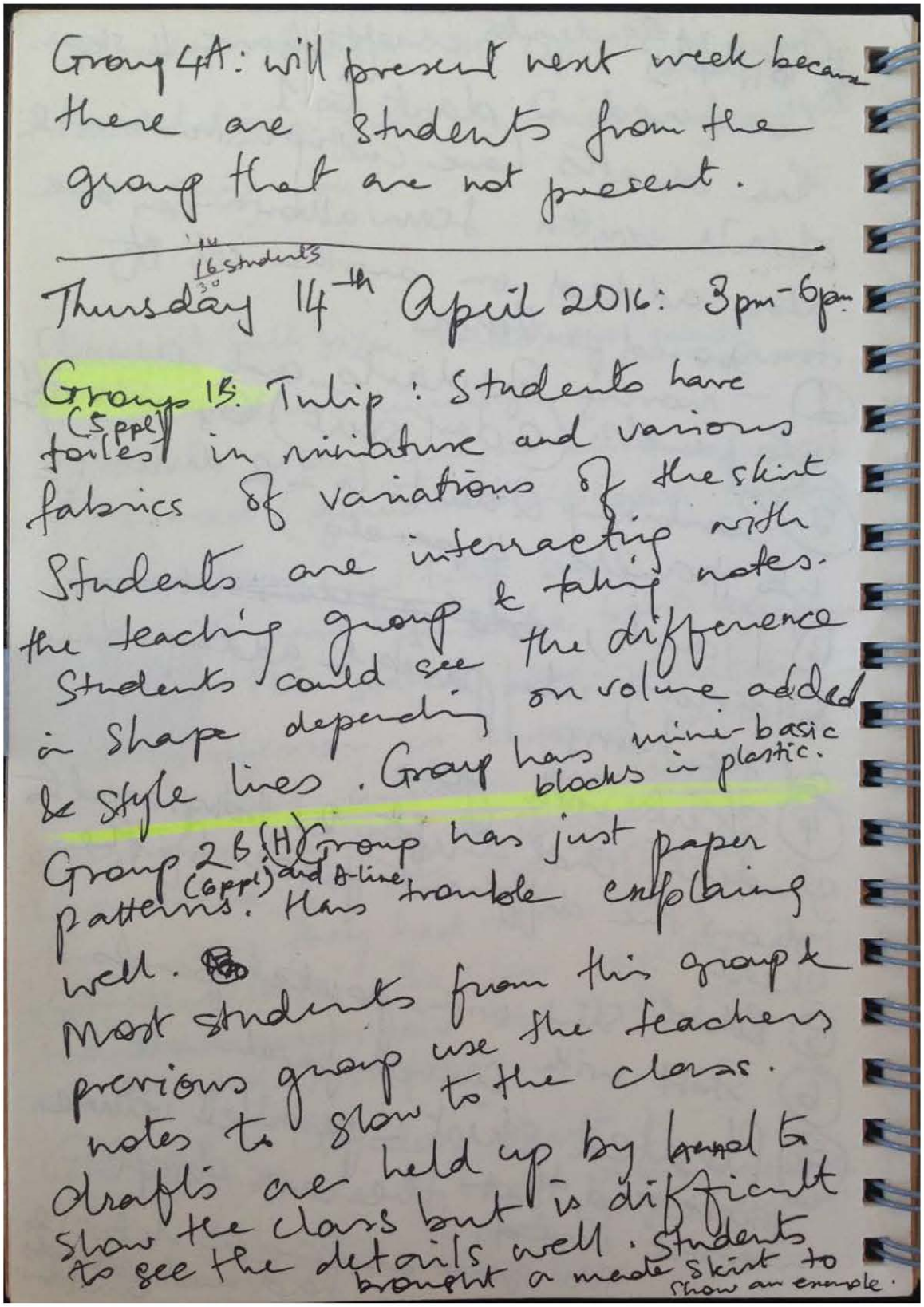


Figure 46 - Photo of notes taken during class observations. (Author, 2016)


Group 4A: will present next week because there are students from the group that are not present.

16 students
30

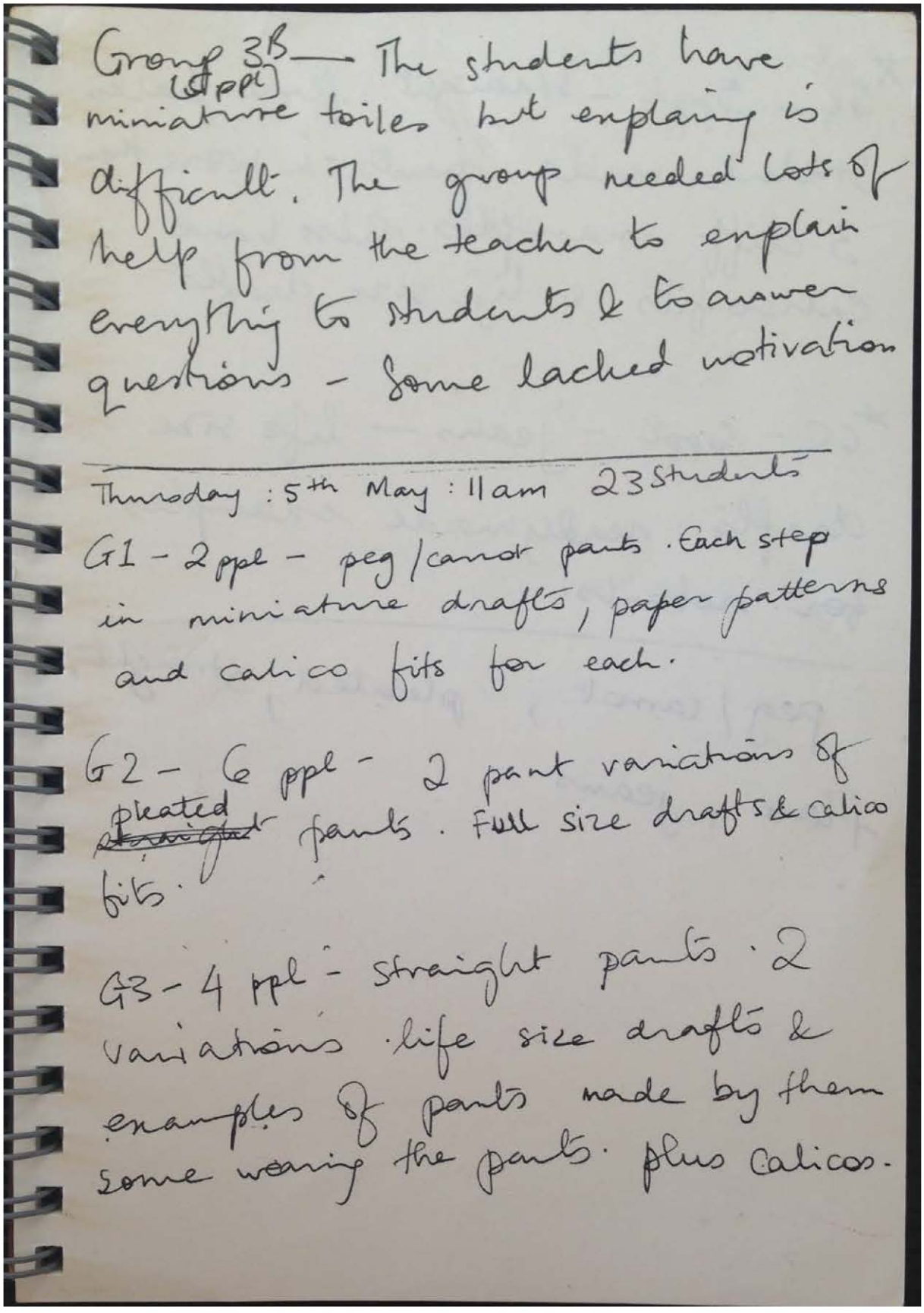
Thursday 14th April 2016: 3pm-6pm

Group 1B: Tulip: Students have (5 ppl) toiles in miniature and various fabrics of variations of the skirt. Students are interacting with the teaching group & taking notes. Students could see the difference in shape depending on volume added & style lines. Group has mini basic blocks in plastic.

Group 2B (H) Group has just paper (6ppl) patterns. Has trouble exploring well.

Most students from this group & previous group use the teachers notes to show to the class. Drafts are held up by hand to show the class but is difficult to see the details well. Students brought a made skirt to show an example.

Figure 47 - Photo of notes taken during class observations. (Author, 2016)


Group 3B (4ppl) — The students have miniature toiles but explaining is difficult. The group needed lots of help from the teacher to explain everything to students & to answer questions - Some lacked motivation

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Thursday : 5th May : 11am 23 Students

G1 - 2 ppl - peg / cannot pants. Each step in miniature drafts, paper patterns and calico fits for each.

G2 - 6 ppl - 2 pant variations of ~~straight~~ pleated pants. Full size drafts & calico fits.

G3 - 4 ppl - straight pants. 2 variations. life size drafts & examples of pants made by them some wearing the pants. plus calicos.

Figure 48 - Photo of notes taken during class observations. (Author, 2016)

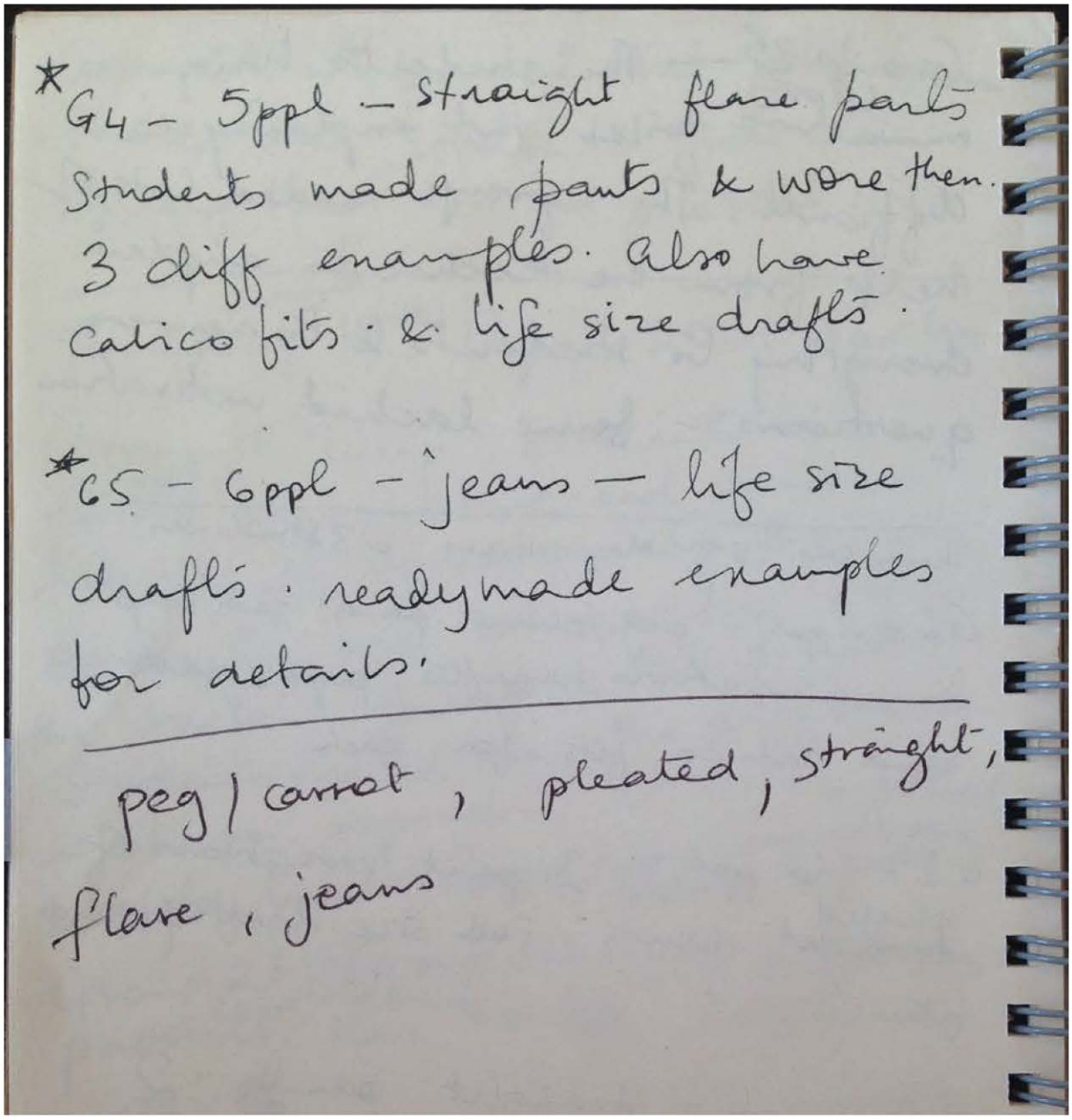


Figure 49 - Photo of notes taken during class observations. (Author, 2016)

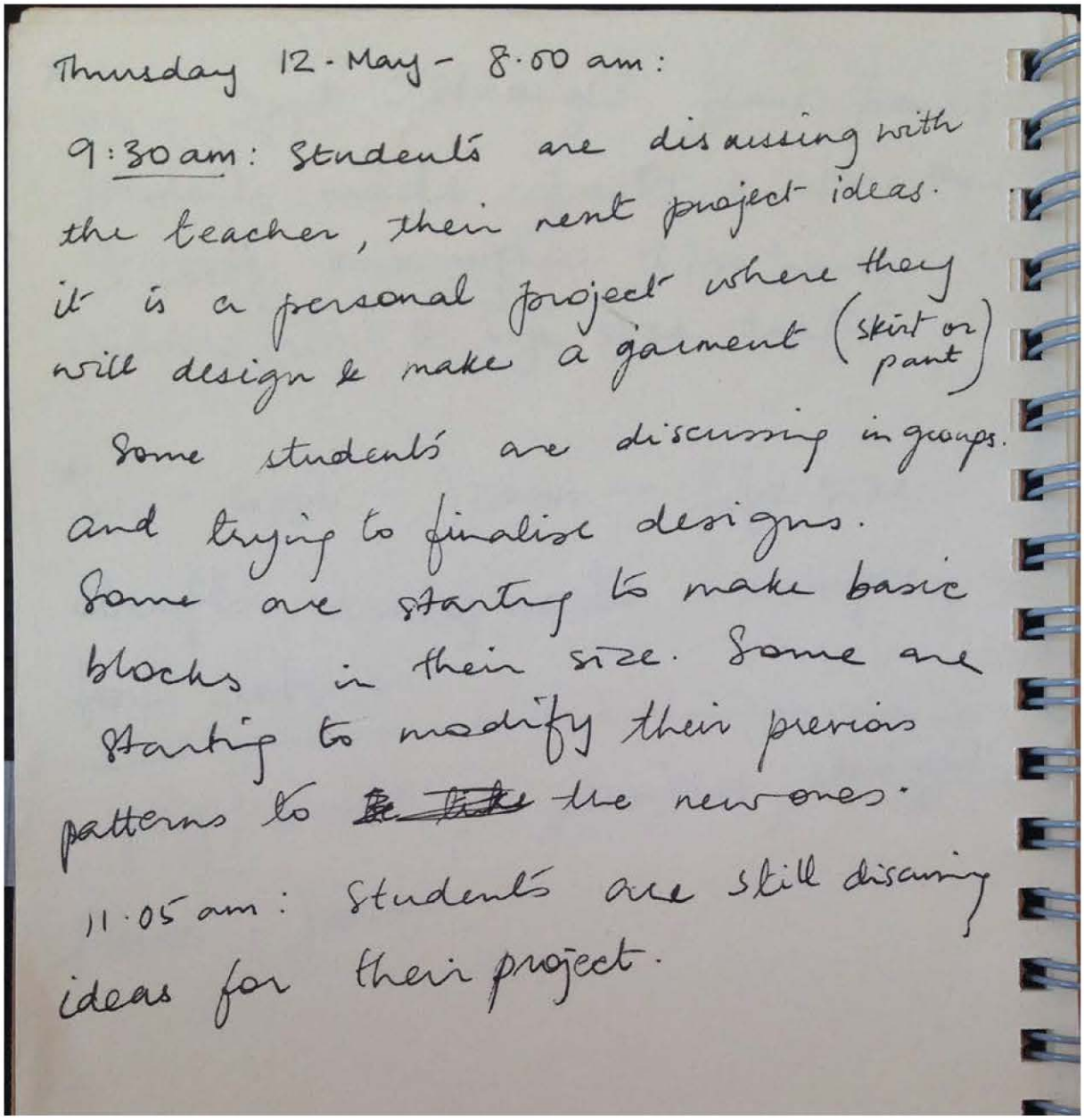


Figure 50 - Photo of notes taken during class observations. (Author, 2016)

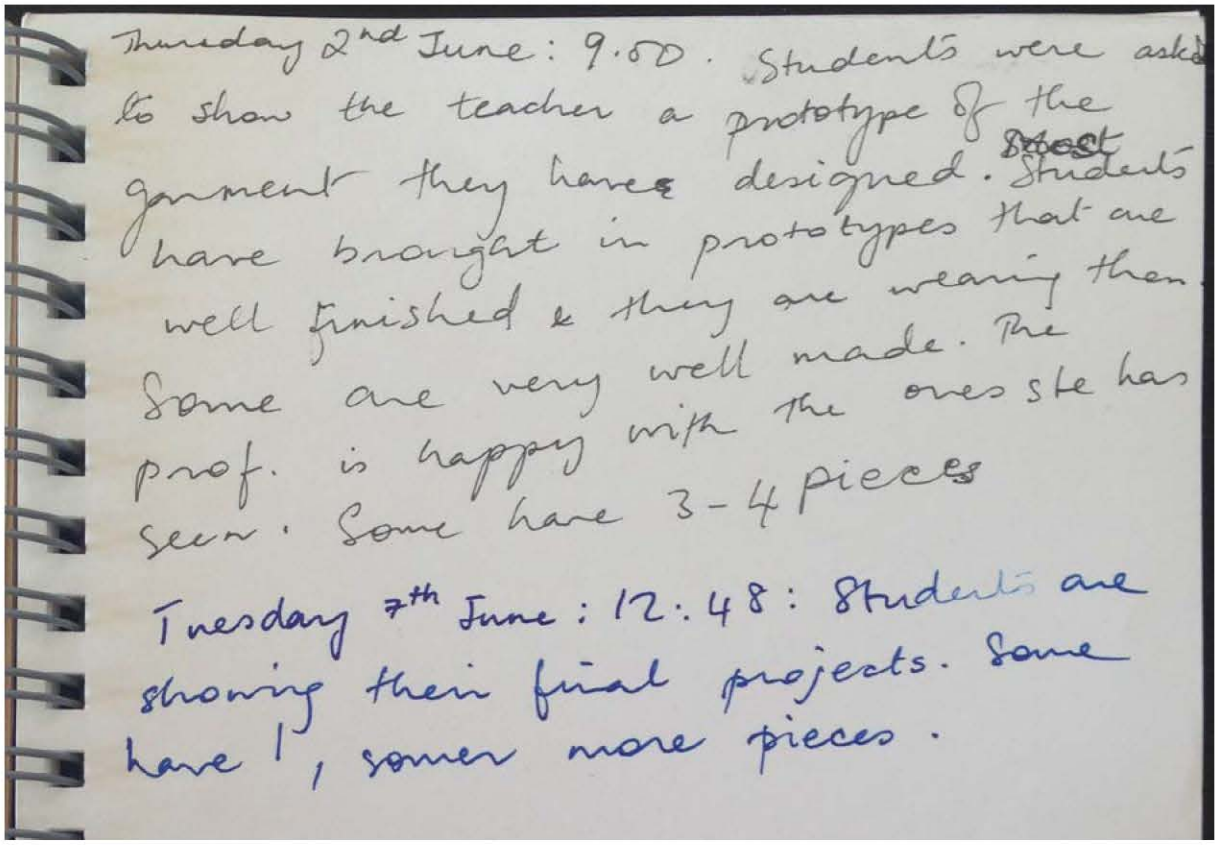


Figure 51 - Photo of notes taken during class observations. (Author, 2016))

Photographs:

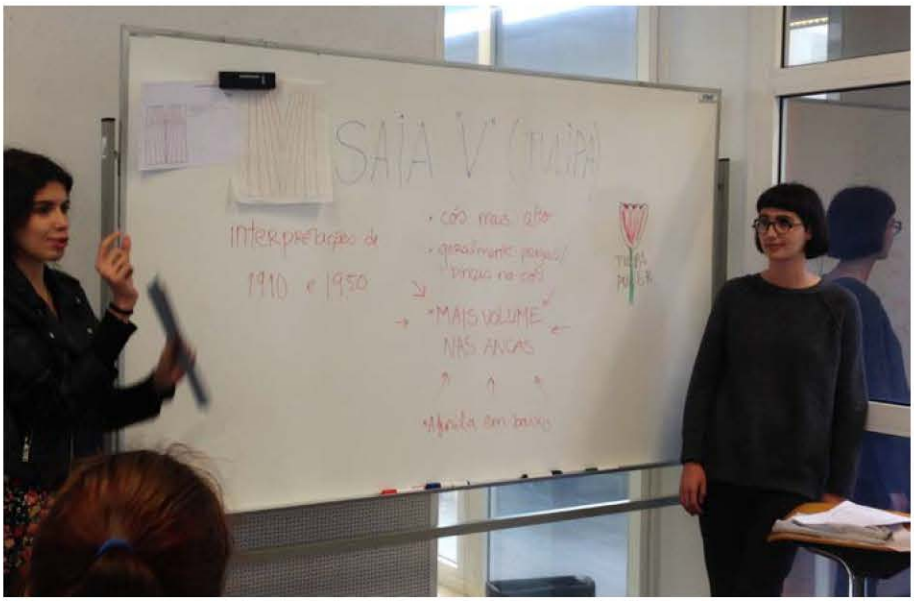


Figure 52 - Photo of Students teaching in class. (Author, 2016)

Figure 53 - Photo of students teaching and taking notes. (Author, 2016)

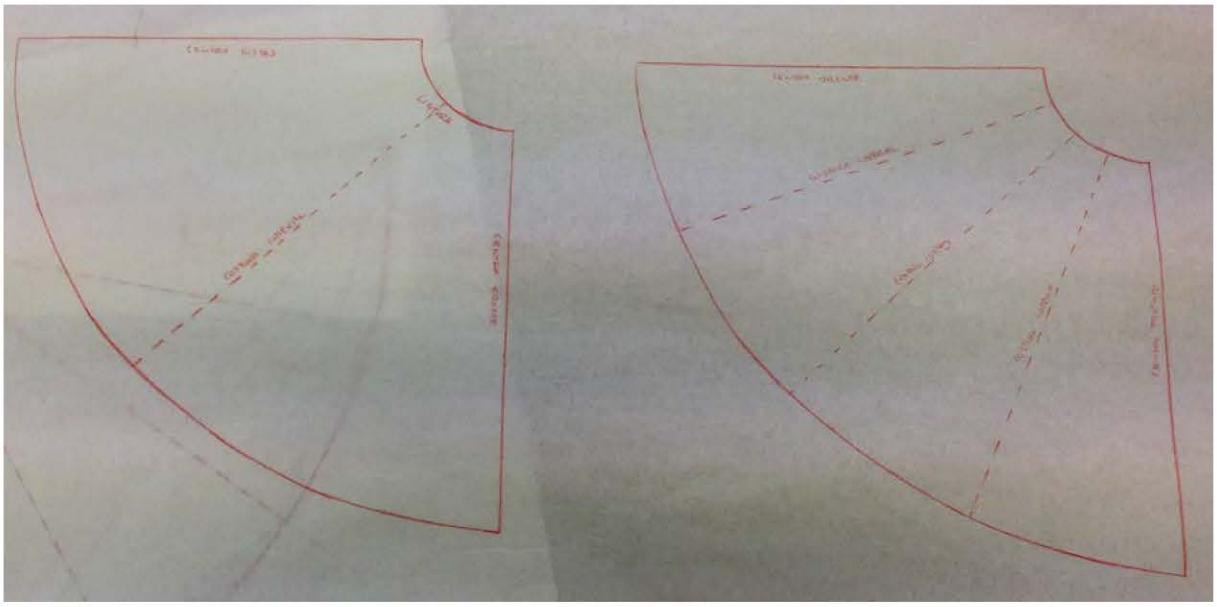


Figure 54 - Photo of students drafts. (Author, 2016)

Figure 55 - Photo of students teaching. (Author, 2016)

Figure 56 - Photo of students teaching. (Author, 2016)

Figure 57 - of students teaching. (Author, 2016)

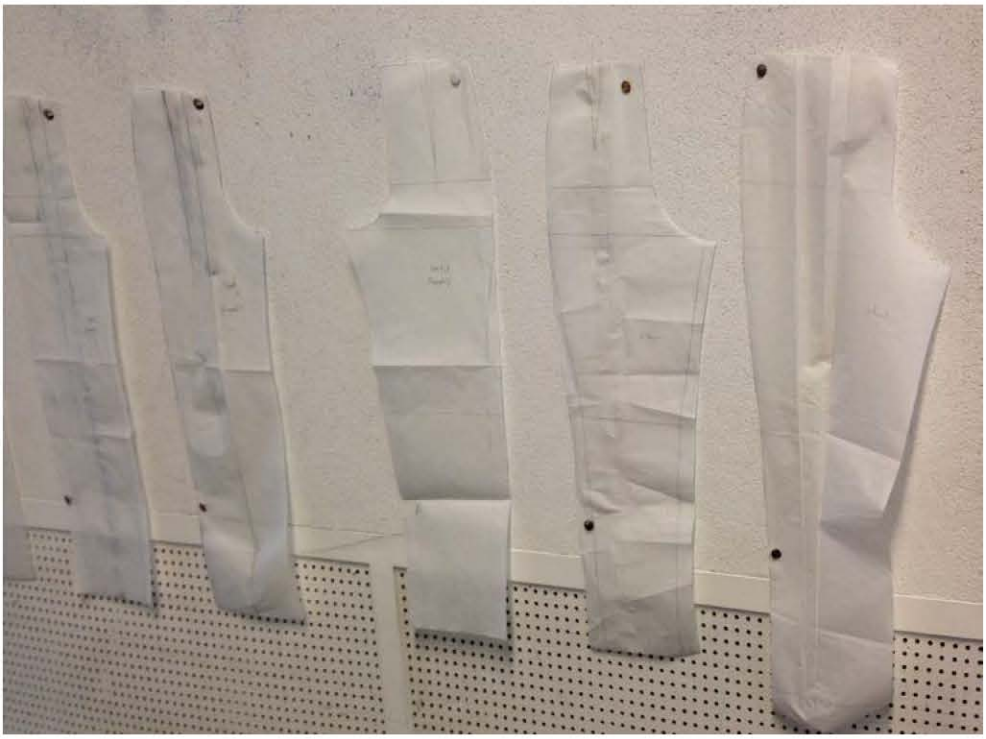


Figure 58 - Photo of students' pattern pieces. (Author, 2016)

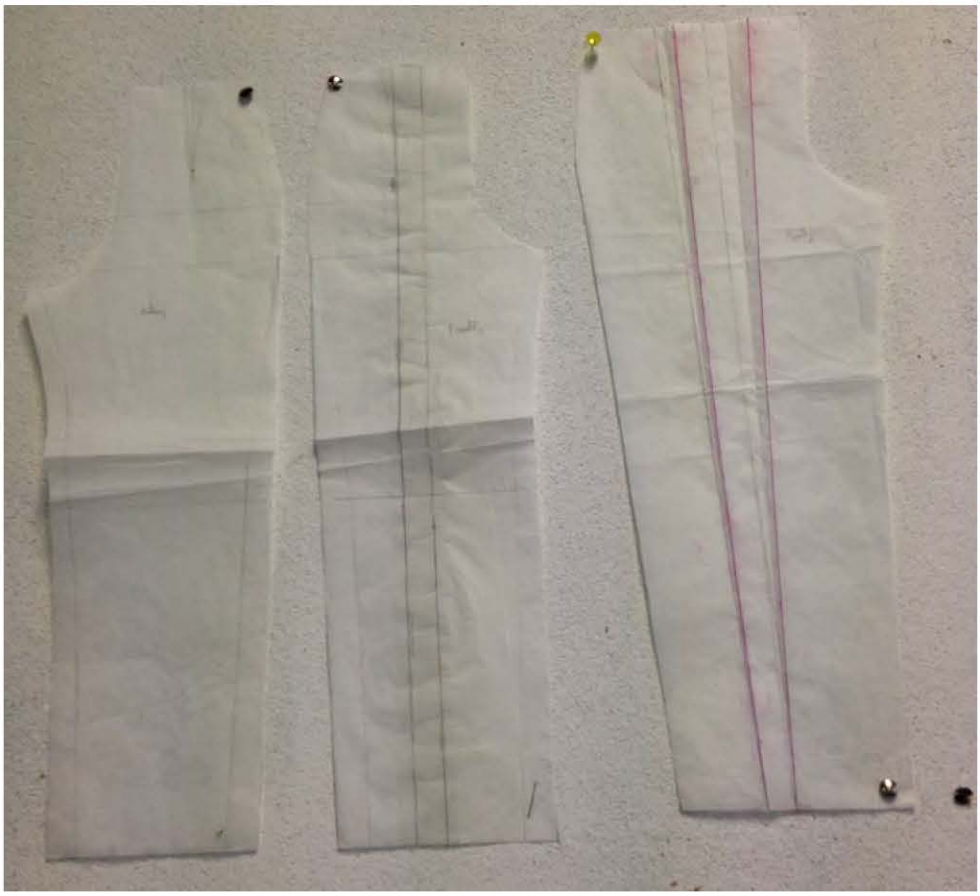


Figure 59 - Photo of students' pattern pieces. (Author, 2016)

Figure 60 - - Photo of students' toiles and presentation. (Author, 2016)

Figure 61 - Photo of students' final garment and pattern pieces. (Author, 2016)

Figure 62 - Photo of students' projects. (Author, 2016)

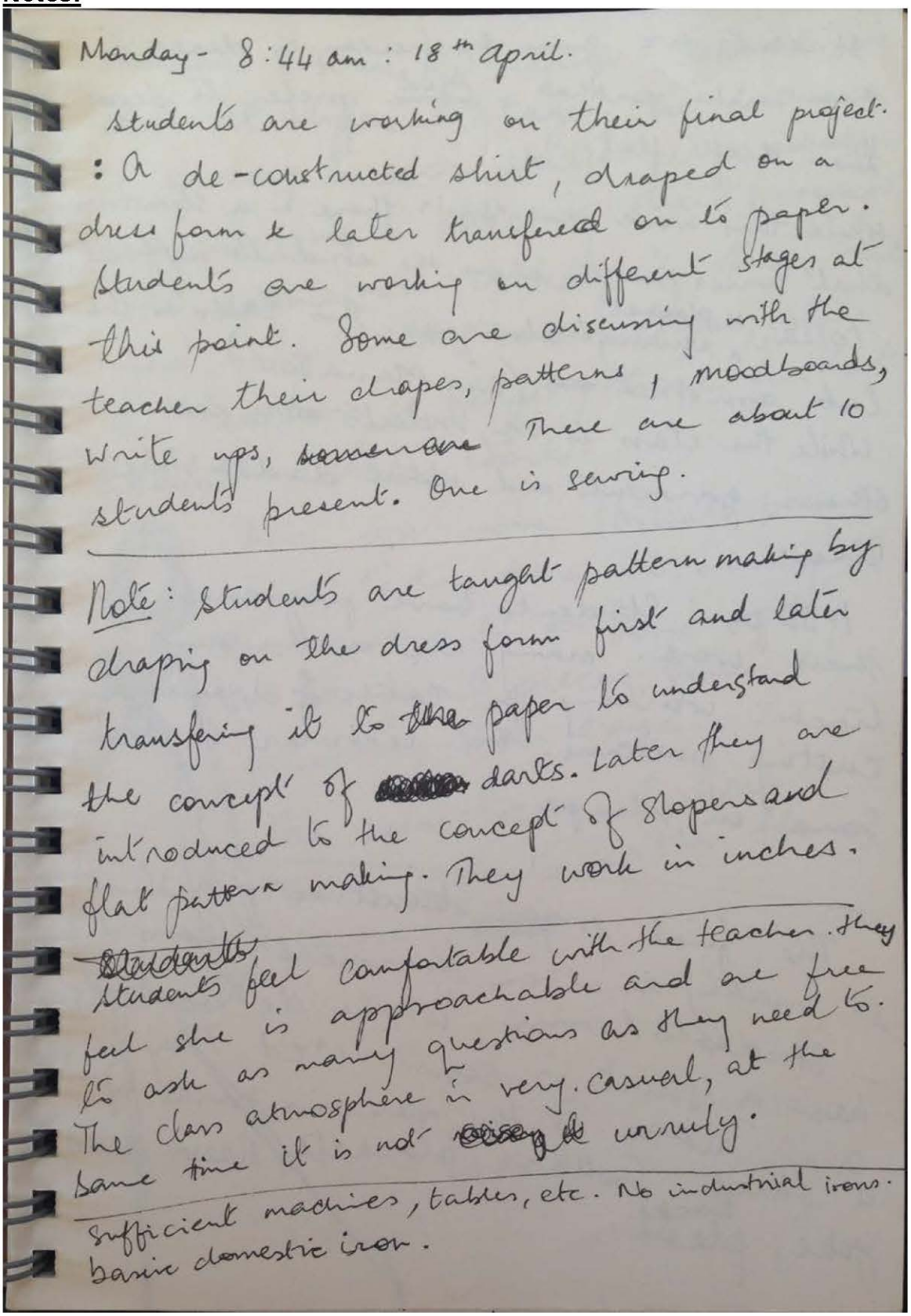
Figure 63 - Photo of students discussing their final garments. (Author, 2016)

Figure 64 - Photo of students' projects in progress. (Author, 2016)

Figure 65 - Photo of students' final garments. (Author, 2016)

7.2.2 | Case 2

Notes:


Monday - 8:44 am : 18th april.

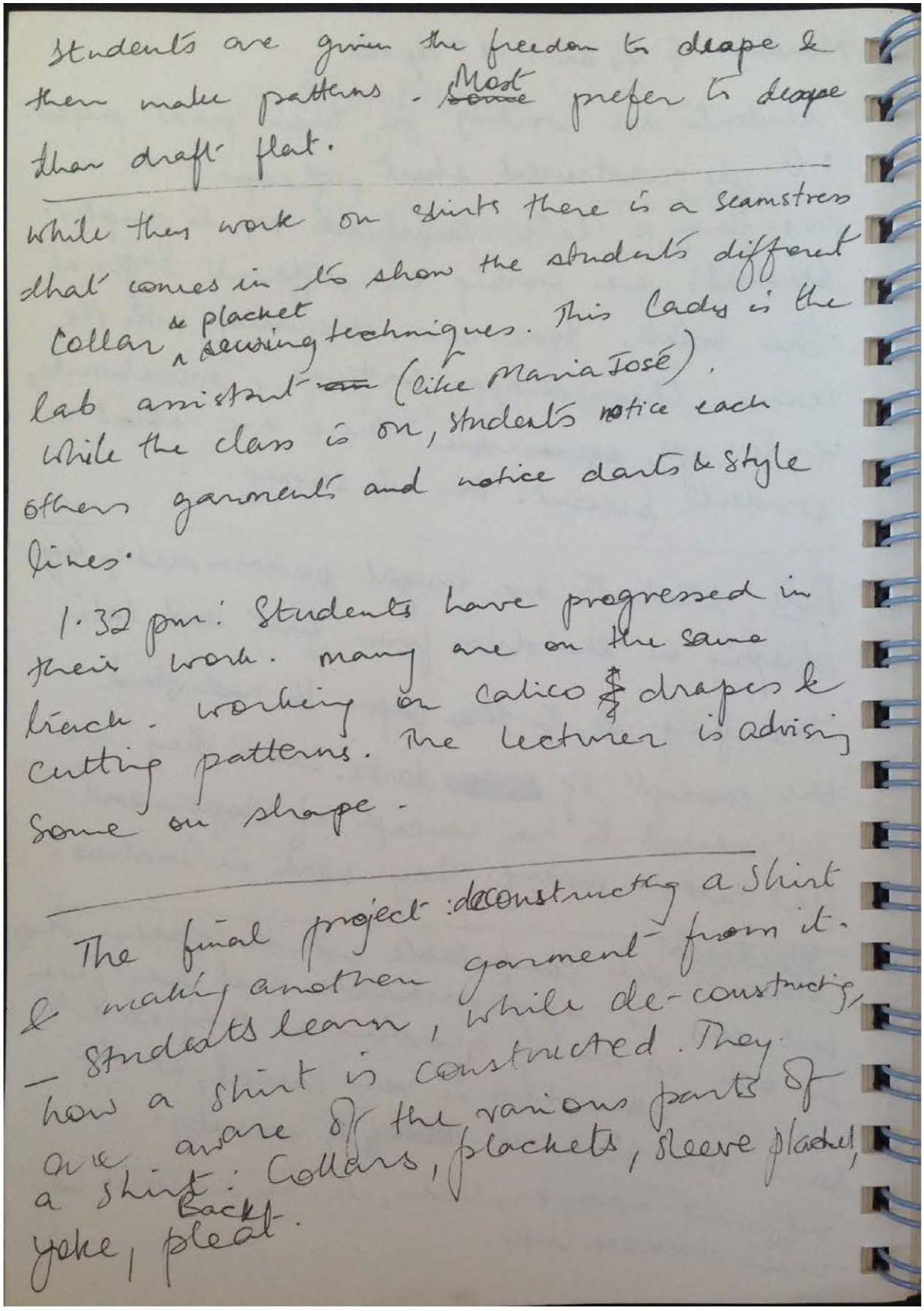
Students are working on their final project. : A de-constructed shirt, draped on a dress form & later transfered on to paper. Students are working on different stages at this point. Some are discussing with the teacher their drapes, patterns, moodboards, write ups, ~~someone~~ There are about 10 students present. One is sewing.

Note: Students are taught pattern making by draping on the dress form first and later transfering it to ~~the~~ paper to understand the concept of [redacted] darts. Later they are introduced to the concept of slopers and flat pattern making. They work in inches.

~~Students~~ Students feel comfortable with the teacher. They feel she is approachable and are free to ask as many questions as they need to. The class atmosphere is very casual, at the same time it is not ~~[redacted]~~ unruly.

Sufficient machines, tables, etc. No industrial irons. basic domestic iron.

Figure 66 - Photo of notes taken during class observations. (Author, 2016)


Students are given the freedom to drape & then make patterns - ~~Some~~ Most prefer to drape than draft flat.

While they work on skirts there is a seamstress that comes in to show the students different collar & placket sewing techniques. This Lady is the lab assistant ~~~~ (like Maria José).

While the class is on, students notice each others garments and notice darts & style lines.

1.32 pm: Students have progressed in their work. many are on the same track. working on calico & drapes & cutting patterns. The lecturer is advising some on shape.

The final project: deconstructing a shirt & making another garment from it. Students learn, while de-constructing, how a shirt is constructed. They are aware of the various parts of a shirt: Collars, plackets, sleeve placket, Back yoke, pleat.

Figure 67 - Photo of notes taken during class observations. (Author, 2016)

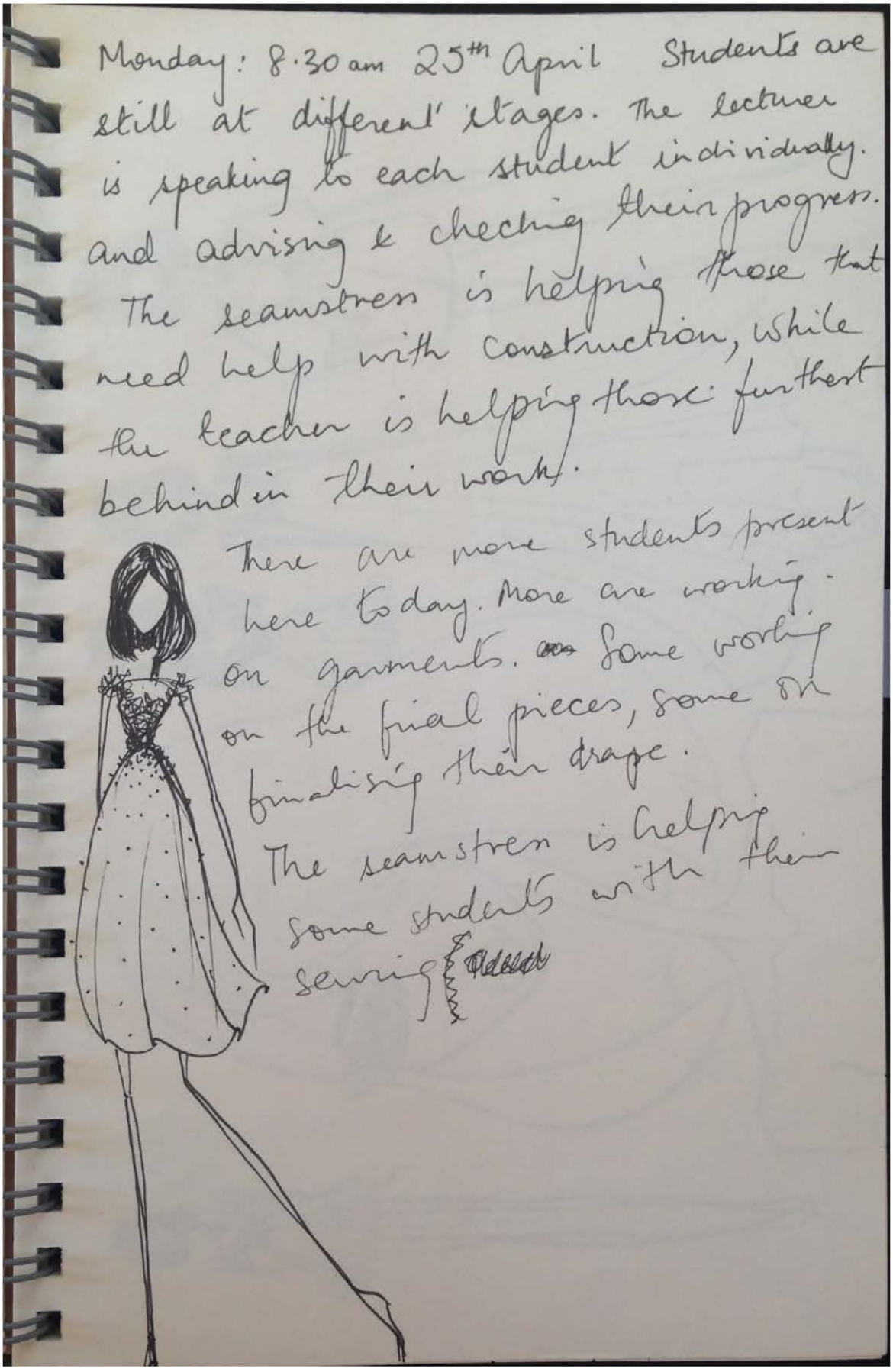


Figure 68 - Photo of notes taken during class observations. (Author, 2016)

7.2.3 | Case 3

Photos:

Figure 69 - Photo of class in progress. (Author, 2016)

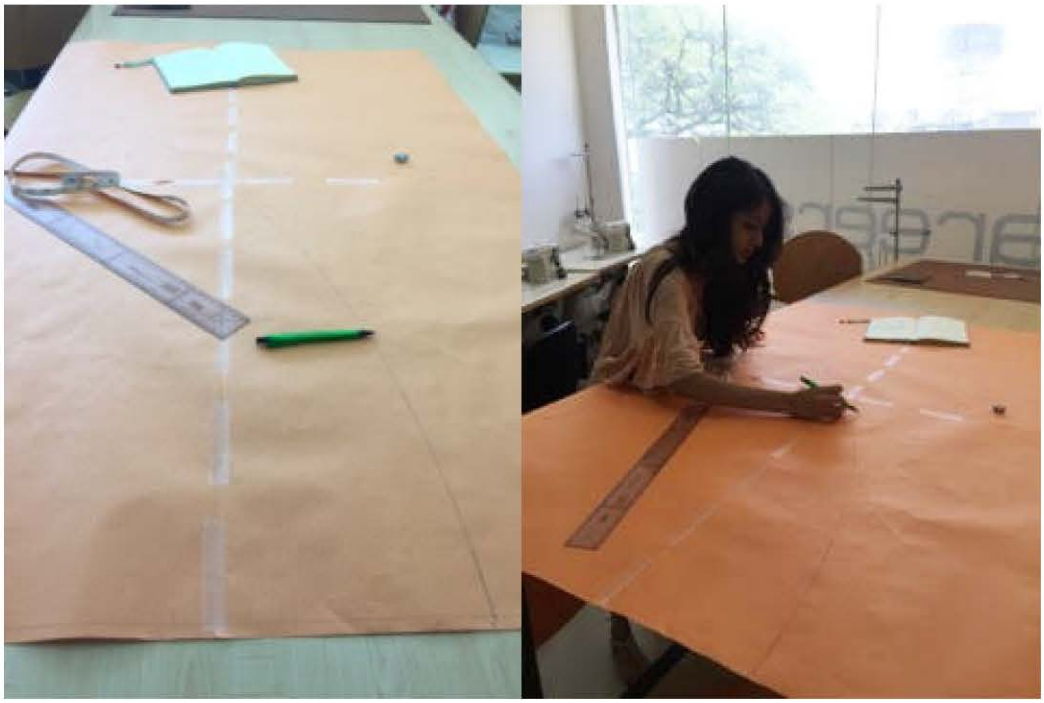


Figure 70 - Photo of students' drafts and a student working on a draft. (Author, 2016)

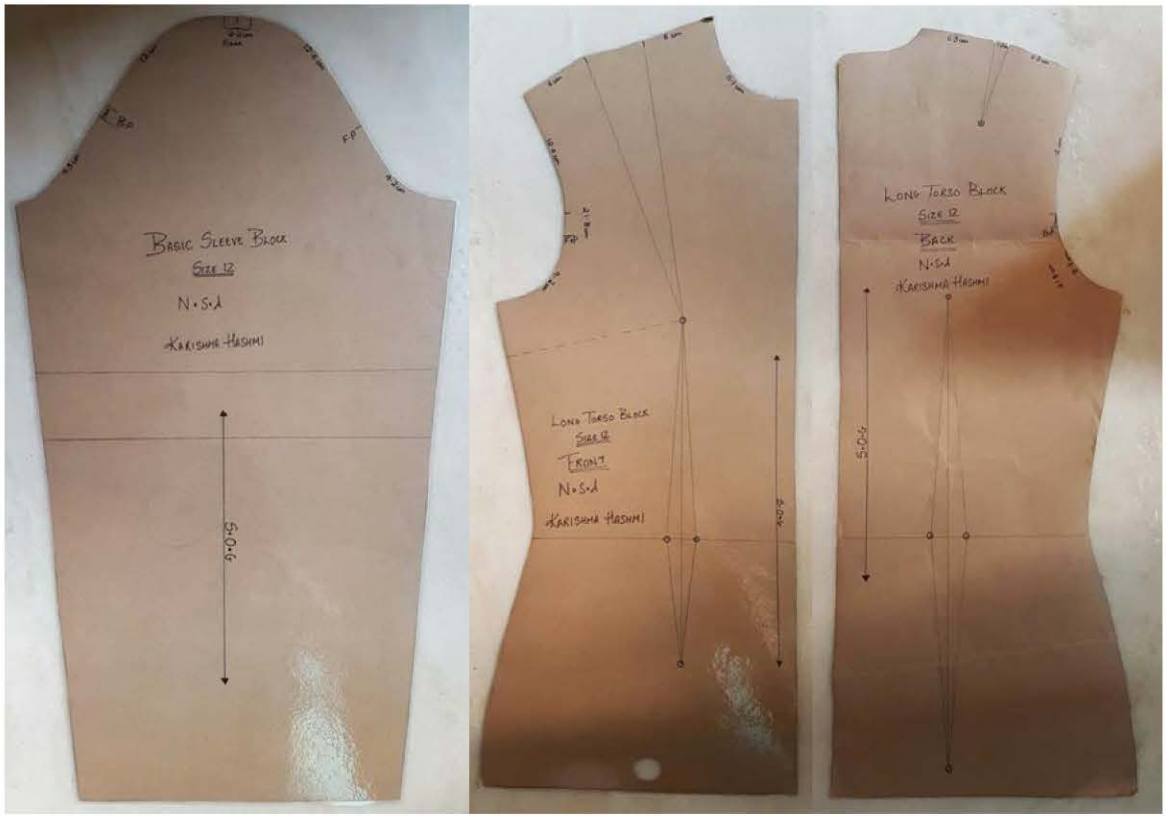


Figure 71 - Photo of a student's long torso and sleeve blocks. (Author, 2016)

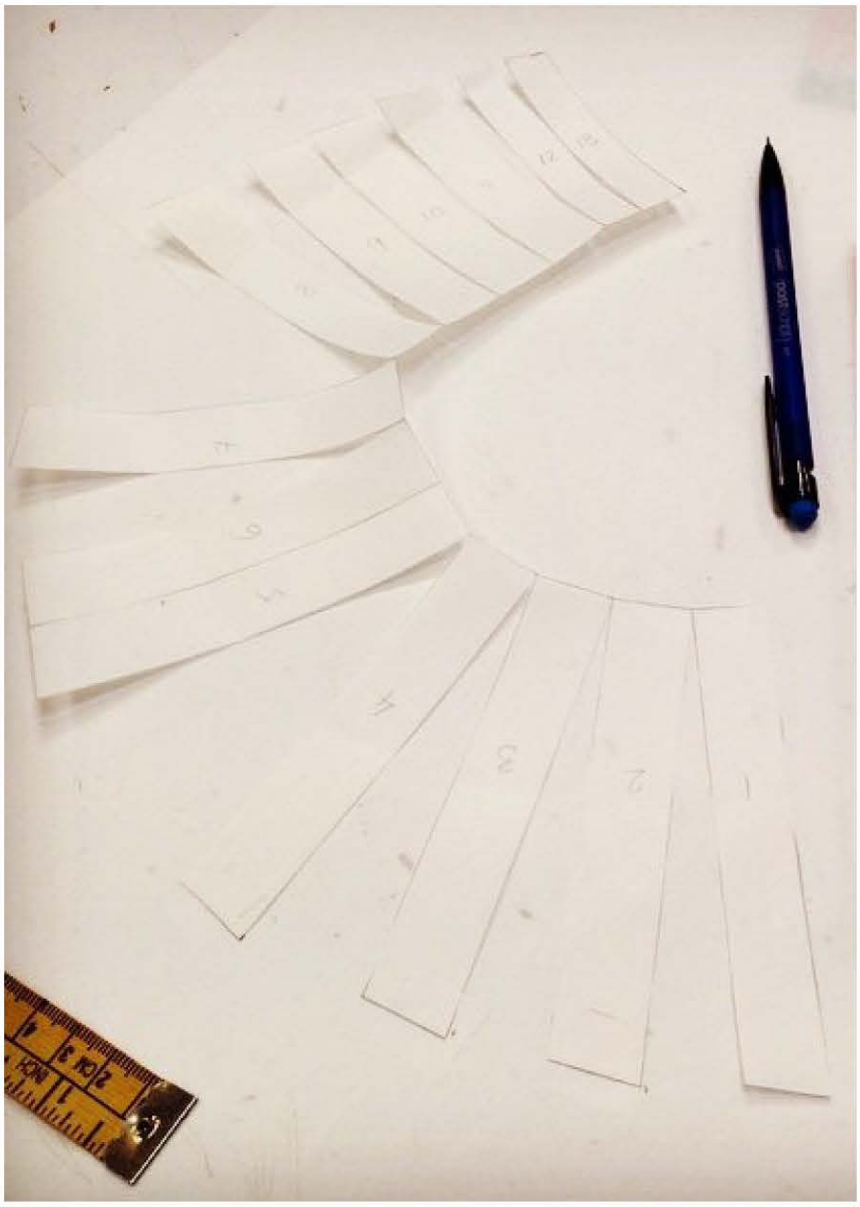


Figure 72 - Photo of a student's peplum pattern piece. (Author, 2016)

FACULDADE DE ARQUITETURA
UNIVERSIDADE DE LISBOA

PARECER FINAL DO ORIENTADOR

Para os devidos efeitos, declara-se que os exemplares definitivos da Dissertação de Mestrado em Design de Moda de título *The Efficiency of Methods Used for Teaching and Learning Patternmaking: A Comparative Analysis*, agora entregues pela Aluna **Siobhan Danielle D'Silva**, que Orientei, incluem as sugestões de reformulação formuladas pelo Júri, cumprindo, assim, todos os requisitos exigidos pela FA.ULisboa.

Lisboa, 10/01/2017

O Orientador

Doutora Inês Simões
Professora Auxiliar da FA.ULisboa

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