# SURFACE DESIGNING AND ITS AESTHETIC USE AS TEXTILE SKILLS IN VOCATIONAL INSTITUTES

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**ABSTRACT**
*Fabric marbling is the art of applying two or more colors to the fabric while it is wet. In contrast, smocking manipulates fabric techniques, including gathering, shirring, pleating, origami, and smocking. This aims to study and introduce advanced textile skills that may be incorporated into the vocational education curriculum. Smocking and marbling techniques are the skills that could be introduced to vocational learning. For physical characteristics and efficiency, the smocking and marbling specimens were examined in textile testing laboratories. The outcomes were all positive for coloring fastness aspects, and silk, the most substantial fabric for the smocking, showed a positive response for the elongation test. The survey's conclusion was focused on the awareness and adoption of stated skills in vocational institutes; certain vocational institutions have established programs for innovative textile skills, and there are variances in skills offered in rural and urban vocational centers. Due to limited resources, several respondents argued that these abilities should be reinstated in the curriculum of vocational institutions so that students might benefit from new creative skills in the future, as market demand dictates.*

**KEYWORDS**
*Vocational Education, institutes, skills, marbling, smocking*

## INTRODUCTION

Fabric painting is now a respected art form on a global scale and is regularly used for both leisure and commerce. Since people began combining fibers to make the first fabric, fabric painting has existed. The earliest humans painted their bodies and then painted the fabrics they made using the same techniques. There are two main types of fabric paintings. The act of physically applying a colored image to a fabric is known as coloring. Patterning was resist-printing in patterns and coloring the resulting image on the fabric. Since the beginning, artists have decorated fabrics using various techniques, from the highly accomplished to others so simple that even total beginners can produce lovely products. Decorating cloth provides an excellent opportunity to explore colors, textures, and designs. The created items can also be utilized in other creative projects. Fabric can be adorned in various ways, including with appliqué, printing, beads and sequins, stitching, and painting. (Mawufemor *et al*., 2019).

Any skill-based program that gives students the marketable abilities they need for independence (Elizabeth, 2021a). It has been discovered that knowledge and skills are significant contributors to social stability and macroeconomic growth. When training programs are supported by private finance, public-private partnerships play a crucial role. Skills are divided into hard skills and soft skills. Technical expertise is referred to as "hard skills," whereas personality traits are referred to as "soft skills." (Kaur & Kaur, 2020). As well as contributing to aligning professional, academic, and general information, education provides people with the skills necessary to deal effectively with various situations. (Osei *et al*., 2022). A skilled person must be able to accomplish a specific activity or objective, such as correctly stitching the seam and finishing the stitches on the fabric. "Skill learning" describes how students learn or acquire a new skill through motor learning. (Obiana *et al*., 2022). Graduates who have gone through the fashion and textiles program and are now working have offered direct input to the study. According to the survey, Koforidua Technical University fashion design and textile graduates must acquire enough skills and competencies in Fashion Design and Textiles to prepare students well for the job market. (Osei *et al*., 2022).

The purpose of the clothing and textiles curriculum in educational institutions is to instruct students on how to strategically plan and utilize local resources to meet better their demands for personal, family, and societal apparel. Including clothes, textiles, and fashion in school curricula also allows students to complete an apprenticeship in these fields, which, if done well, will provide them with the skills necessary to find employment in the future. Students would receive training in the topic for jobs in clothing and textile factories and homemaking (Obiana *et al*., 2022).

## LITERATURE REVIEW

A sort of education called vocational skill acquisition allows people to train or influence others with their knowledge. One-way individuals can learn new information or skills that have helped them feed themselves and others is through education. For any civilization to have meaningful progress, it must have an effective and well-planned educational system. The rule of education in society is extensive, especially in successful change and boastful growth. It is an instrument of "par excellence" that serves as a means to an end. A nation's growth process is achieved through education, the cornerstone of all human endeavors (Emmanuel, 2020).

Smocking is a fabric manipulation method that involves stitching from the fabric's reverse side, adding the distinct and individual visual charm of handwork. Making tiny, regularly spaced decorative stitches to form rounded gathers and tucks on clothing is known as smocking, one of the oldest crafts that man has utilized to express his passions, opinions, and emotions. The structure of smocking is thought to be more erratic and complex with random stitches and the blending of several techniques. It is claimed that mix-and-matching can inspire and help with idea generation. It can also help in smocking by allowing you to explore new dimensions by fusing seemingly unrelated materials. It would highlight and enhance each other's rich textures. (Mansour, 2020).

Fabric origami is one of these more recent experiments rooted in smocking. In fabric origami, knots, and ties join places drawn on the fabric, much like smocking. Fabric origami, on the other hand, permits the ensuing gathering of the fabric to flatten into pleats on the other side, in contrast to smocking, which allows the cloth to move freely and wrinkle. Origami artist Chris Palmer developed this method to produce a variety of "Shadow folds," or tessellation designs, for use in textile ornamentation. (Wu, 2022). There are numerous current smocking designs in addition to the traditional ones. Dots are arranged in pairs and imprinted to the cloth, creating a pattern that, when stitched, creates a smocking design and pleats. Smocking is a highly ornamental element that also serves a practical purpose by allowing a clothing panel to expand. (Mawufemor *et al*., 2019).

Inks that float on the water's surface create the pattern design known as marbling. The marbling technique is based on manipulating afloat paint to create patterns on the surface of a liquid. The distinctiveness of the marbling pattern itself gives this pattern design its artistic appeal. Marbling can't be replicated to produce the same pattern a second time; it can only be created once. This is because of the flow of color, water, and air. (Hafiza *et al*., 2021). Thanks to technological advances, marbling, which has historically been practiced on paper, may now be used on various other materials. Marbling's renown has grown globally due to being added

to UNESCO's list of intangible cultural treasures. Initially utilized as an auxiliary art to embellish book bindings, it has earned its rightful place today as a distinct branch of art (Hatice *et al*., 2022).

The possibilities for art, however, expand beyond these conventional applications to include a variety of objects with both utilitarian and aesthetic functions. Today, marbling is also often used to decorate fabrics. Floating fabric paints or pigments accomplish this in a cellulosic (sizing) solution, similar to oil floats on water. The paints are swirled into patterns, and the design is then captured by placing a treated fabric on top of the paint to transfer the swirls to the fabric. (Dzramedo & Ahiabor, 2020a). Marbling is a process that can be used to create textile products but is typically exclusively done on paper, being tested on various raw materials for decorative items. Leather, wood, felt, glass, and ceramic paste are raw materials applied to marbling felt, glass, and cloth. Hikmet Barutçugil invented the gunpowder marbling variety called by his name. Marbling is a style of painting used by Nedim Sönmez. Tile painters successfully applied marble on tiles. (Hatice *et al*., 2022).

Smoking and the art of marbling were examined in this study as two skills that need to be promoted and incorporated into programs for vocational training. To do this, samples for smocking and marbling were made, and various aspects were evaluated. For this, textile tests were conducted to assess the properties of the samples. Tests on color fastness and elongation were carried out on marbling samples and smocking samples, respectively. Students who pursue these skills in the future, particularly those who attend vocational institutes, should benefit from the available resources. A survey about the abilities in issue was also gathered, along with the opinions of teachers and department heads. Textile organizations can improvise and momentarily incorporate these abilities into the vocational education curriculum.

## RESEARCH OBJECTIVES

1. Identify and evaluate the innovative textile skills that can be offered in the vocational institute's textile curriculum.
2. Collect suggestions for implementing textile skills in the curriculum from the heads of the departments and teachers of vocational education.
3. Creating samples and evaluating the efficiency of surface design techniques. (i.e., marbling, smocking.

## RESEARCH METHODOLOGY

### Research Design

The research was a Descriptive Observational study. The data was collected from the teachers and heads of Departments of different vocational institutes in Faisalabad, Pakistan, using a self-generated questionnaire.

**Sample and Sampling Technique**

The sample size was forty, and the Probability Random sampling Technique was allocated to collect the data, which was further analyzed using spss.23.

**Instrumentation**

Also, the samples of Marbling and Smocking were created on which the basis of data was collected. The materials used for making marbling samples were acrylic paints, corn starch, alum, a printing tray, a dropper, a toothpick, cotton, and silk fabric. The materials for making smocking samples were silk fabric, pen, thread, and simple needle. These samples were created and tested in the laboratories of the University of Agriculture, Faisalabad, Pakistan. The marbling samples were created after treating the fabric with alum and salt. The mixture of water and starch was made, letting fabric paints float on top of a size or thick cellulose solution, much like oil does on water. The colors on the surface are swirled into designs. In the dye bath, drop by drop of paint using the bottle's nozzle. Comb and toothpick to create innovative and different designs. Design combs or toothpicks are used in different directions for formation. The cloth was carefully placed on the dye bath, so the design could not be disrupted. Press the fabric from the top to create all the designs on the sample piece. I carefully took the fabric out of the dye bath and ironed it.

Carefully and precisely trace the cloth with the pen to make smocking samples. At the starting location, sew the first stitch. The patterns drawn were stitched together with each other with the help of the same thread and needle. I connected the two ends. Decide whether or not to tie up the ends. I have observed the pattern's directions. Sew the two dots together where a color line connects them. Please write down the stitching order to make it easier to recall the next time. Tie off securely after finishing a group of stitches. To be safe, tie multiple times. Sometimes, you don't need to stop to save time, but things could get messy. These samples were tested in the laboratories to check their properties and characteristics. The tests were elongation tests for smocking and color fastness tests for marbling samples, i.e., light fastness, washing fastness, and rubbing fastness. The test specimen is clamped in a machine to determine the fabric's Elongation for smocking the sample. The specimen was subjected to force by the machine, which caused the fabric to tear apart. Breaking force and the +value of fiber elongation can be readily obtained from manual machines' scales, dials, or recording charts. At the same time, the measurements are taken from computers connected to the necessary testing apparatus, such as automation devices. Standard Test Method No. Used for this was ASTM D5035.

For Colorfastness to rubbing - ISO 105-X12 (AATCC Standard) provides a technique for assessing the durability of the color of textiles of all types to rubbing off and staining other materials, including textile apparel and garments. This method tests the

specimens after being rubbed for a particular duration. Because the fabric is subjected to a lot of rubbing and abrasion, this test is intended to determine the degree of color and finish that may be transferred from the surface of colored textile materials to another surface by rubbing. There were two tests, one for dry rubbing and one for wet rubbing.

For the light fastness test for the marbling samples method, ISO 105-B02 provides a technique for assessing the influence of an artificial light source equivalent to natural daylight on the color of textiles of all types and in all forms (D65). The degree to which a dye resists fading when exposed to light is referred to as its light fastness. The various dyes have different levels of resistance to light fading. All dyes are subject to light deterioration since their brilliant colors imply they absorb wavelengths that do not reflect. Light is energy, and the energy absorbed by colored substances can damage them or the molecules next to them.

ISO 105-C06 defines techniques for assessing the color resistance of textiles of all types and in all forms to domestic or commercial laundry procedures used for typical domestic articles using a standard detergent. Laundered, cleaned, and dried out tested fabrics in contact with the specified adjacent cloth. Under proper conditions, the composite sample is treated in a chemical bath for the specified period. An appropriate liquor ratio and sufficient steel balls create the abrasive action. The suggested grey scale is utilized to assess the color change of the dyed sample as well as the staining of the adjacent material.

**Data Collection**

Data gathering and the study of analytical tools are fundamental requirements that convert information into numerical figures for better comprehension and application of knowledge for those who work together to handle all aspects of the situation. Although balancing activities is somewhat complex, this system helps observe random data despite some downsides, such as unconscious or incorrect information. The data meant to be obtained from the survey was presented on a tabular sheet. This mainly consists of observational inquiries closely relevant to the studied subject. By assuming that the strength and intensity of the responses are linear, the Likert scale, which is used to gauge respondents' levels of agreement or disagreement, provides a comprehensive method for gathering perspectives. Specifications included in this data sheet include:

- Their response expressly indicated whether they agreed or disagreed.
- There, one question has two extreme positions on a seven-point variable scale. With two choices for yes and no.
- In most cases, the selections or answers relate to the statement or question.

**Figure 1:** ***Smocking Samples***

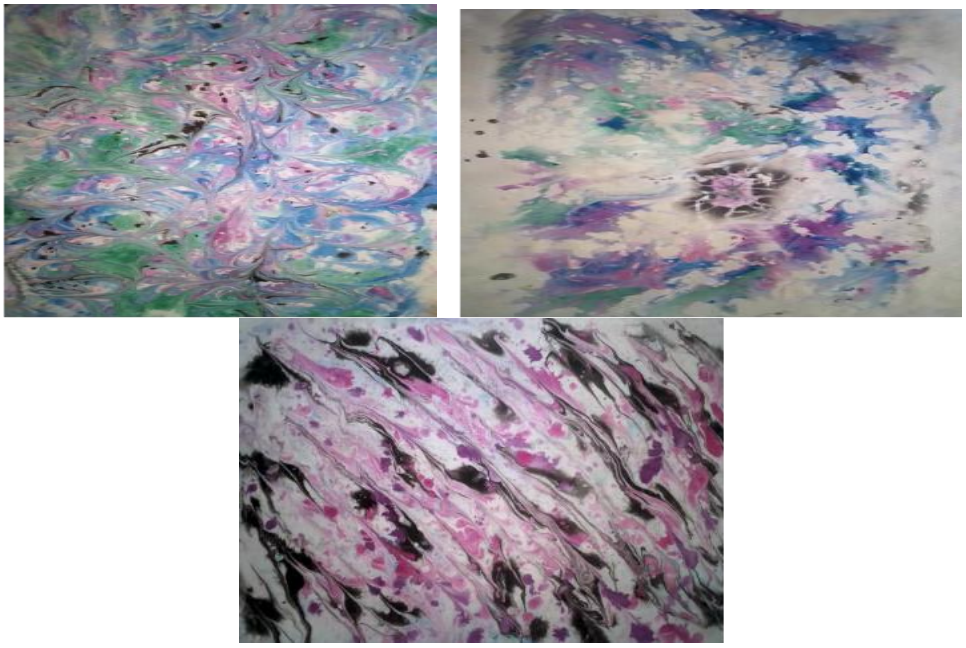

**Figure 2:** ***Marbling Samples***

**DATA ANALYSIS**

Regarding results for the smocking sample, the specimen was made of satin silk, so its breaking force is high compared to other textile fabrics. The specimen was 3 inches in size. It took 50 mm speed to break it with a max load of 3000 N. The elongation of the specimen was 142.51mm, and the tensile strength was 1025.62N. Colorfastness to rubbing - ISO 105-X12 (AATCC Standard) describes a technique for determining the colorfastness of all textiles to rub off and stain other materials, such as textile apparel and garments. The results for wet rubbing were Negative.

It was 4-5 according to the greyscale. The dry rubbing test's result was positive; it was 1-2 on the grey scale. ISO 105-C06 specifies methods for evaluating the color resistance of textiles through washing. The washing fastness results in fiber strips are 3-4 grade for wool, 4-5 grade for Acrylic, 4-5 grade for Polyester, 4 grade for nylon, 5 grade for cotton, and 5 grade for acetate fiber contained in the strip. ISO 105-B02 specifies a method for determining the effect of an artificial light source equivalent to natural sunlight on the color of textiles of all sorts and in all forms (D65)—the result of the ISO 105B02 light fastness test.

At 20 hours of artificial light exposure, the grade obtained from the blue wool scale reading was 4 out of a possible rating of 4-5. In terms of reading and rating, it was Excellent.

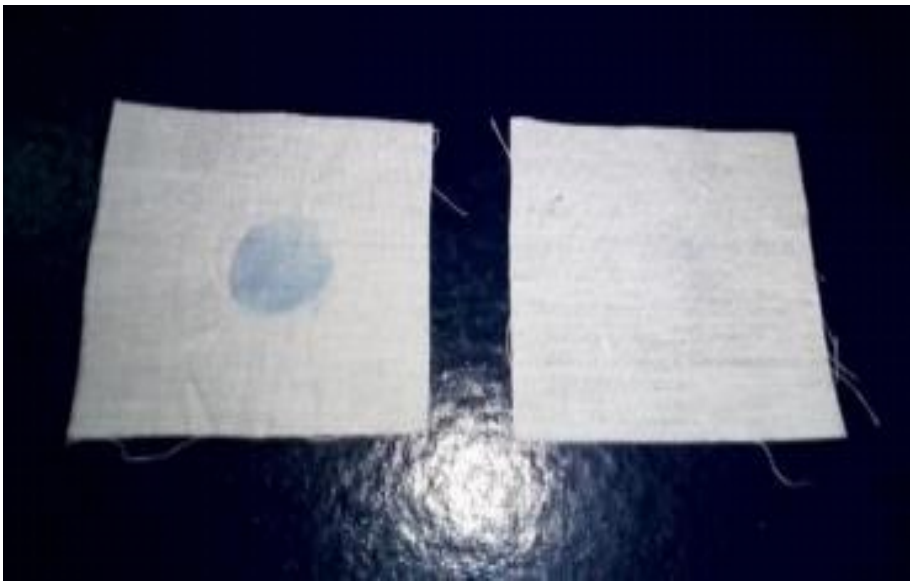

**Figure 3:** ***Rubbing Test***

**Figure 4:** ***Washing Test***

**Figure 5:** ***Lightfastness Test***

**RESULTS**

The analysis of the survey was conducted using IBM SPSS. The questionnaire results consisted of two types of answers: one in the form of a dichotomous question, 'yes and no,' and the other on the Likert scale, which is 'high, very high, low, very low and medium.' In the first question, 85% of the respondents said that they are aware and were teaching surface designing w.r.t smoking and marbling, while 15% said they have low, 42.5% said they have medium, 32.5% have high, and 10% said they have a very high knowledge of smoking and marbling. 57% of respondents agreed with the question about Vocational Institutes and textile departments teaching smocking and marbling as a skill, with 20% as very low, 20% as Low, 42.5% medium, 7.5% high, and 10% as a very high response, indicating the level of skills the institutes were teaching. 97% of respondents agreed to the suggestion of Smoking and marbling as

aesthetic surface designing, with 2.5% as low, 32.5% as medium, 42.5% as high, and 22.5% as very high emphasis of this suggestion. 90% of respondents agreed with the statement that smocking and marbling of fabric can be an option. A skill that can provide profitable business for young girls, 20% as low, 17.5% as medium, 35% as high, and 27.5 had a very high emphasis on the abovementioned statement. Only 62% agreed, while 37.5% disagreed when we inquired about if they think that Smocking and marbling skill is used and done frequently nowadays as surface designing of garments and apparel, with 10% as very low, 15% as low, 47.5% as medium, 15% as high and 12.5% opted to in the very high agreement to support the statement. 50% of respondents agreed, and 50% of the respondents disagreed with the statement about whether they considered the facilities available for such type of design enough for students, with 17.5% as very low, 22.5% as low, 30% as a medium, 17.5% as high and 12.5% as a very high emphasis on the statement mentioned above. 72.5% agreed to the statement when we inquired about whether Marbling and smocking of fabric uses limited resources/ apparatus, with 7.5% as very low, 12.5% as low, 37.5% as medium, 30% as high, and 12.5% as very high agreement to the statement. Regarding whether vocational education provides new innovative techniques, 72% of respondents agreed, with 5% as very low, 20% as low, 30% as medium, 30% as high, and 15% as very high agreement to the statement. 95% suggested reviving the smocking and marbling technique as a textile skill in the vocational institutes, with 5% as very low, 25% as a medium, 37.5% as high, and 32.5% as a very high emphasis on the abovementioned statement. 82.5% of participants agreed that there are variations in the skills taught in rural and urban vocational institutes, with 5% as very low, 22.5% as low, 40% as medium, 20% as high, and 12.5% as very high agreement to the statement. According to the responses, 60% believe the government strives to introduce new skills at vocational institutes. In comparison, 40% believe that the government fails to capitalize on such skills or new talents, with 12% as very low, 25% as low, 25% as medium, 20% as high, and 17.5% as very high, agreeing with the statement. 80% of respondents think that their students and what they learn are accepted in society but not as it should be or as other higher universities students are welcomed, with 7.5% as very low, 22.5% as low, 50% as a medium, 15% as high and 5% as a very high emphasis on the statement as mentioned earlier. 67% of respondents agreed that Vocational staff have enough training/ workshops regarding new textile skills, with 7.5% as low, 27.5% as low, 32.5% as medium, 12.5% as high, and 20% as very high agreement to the statement.

**Table 1:** ***Questionnaire with the Results***

| | Question | Yes | No | Very Low | Low | Medium | High | Very high |
|---|---|---|---|---|---|---|---|---|
| **1** | **Are you teaching/ aware of surface designing w.r.t. smocking and marbling?** | 85.0 % | 15.0 % | | 15.0 % | 42.5% | 32.5 % | 10.0 % |
| **2** | **Are Vocational Institutes and textile departments teaching smocking and marbling as a skill?** | 57.5 % | 42.5 % | 20.0 % | 20.0 % | 42.5% | 7.5% | 10.0 % |
| **3** | **Do you suggest Smoking and marbling as aesthetic surface designing?** | 97.5 % | 2.5% | | 2.5% | 32.5% | 42.5 % | 22.5 % |
| **4** | **Can smocking and marbling fabric be opted for?** | 90.0 % | 10.0 % | | 20.0 % | 17.5% | 35.0 % | 27.5 % |
| | **A skill that can provide profitable business for** | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **young girls?** | | | | | | | |
| **5** | **Do you think smocking and marbling skills are used and frequently used nowadays in the surface design of garments and apparel?** | 62.5 % | 37.5 % | 10.0 % | 15.0 % | 47.5% | 15.0 % | 12.5 % |
| **6** | **Have you considered that the facilities for such a design are enough for students?** | 50.0 % | 50.0 % | 17.5 % | 22.5 % | 30.0% | 17.5 % | 12.5 % |
| **7** | **Does Marbling and smocking of fabric use limited resources/ apparatus?** | 72.5 % | 27.5 % | 7.5% | 12.5 % | 37.5% | 30.0 % | 12.5 % |
| **8** | **Does vocational education provide new innovative techniques?** | 72.5 % | 27.5 % | 5.0% | 20.0 % | 30.0% | 30.0 % | 15.0 % |
| **9** | **Do you suggest** | 95.0 % | 5.0% | 5.0% | | 25.0% | 37.5 % | 32.5 % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **reviving the smocking and marbling technique as a textile skill in a vocational institute?** | | | | | | | |
| **10** | **Are There variations in the skills taught in rural and urban vocational institutes?** | 82.5 % | 17.5 % | 5.0% | 22.5 % | 40.0% | 20.0 % | 12.5 % |
| **11** | **What's your thinking about govt. Policy regarding vocational institutes for said purpose?** | 60.0 % | 40.0 % | 12.5 % | 25.0 % | 25.0% | 20.0 % | 17.5 % |
| **12** | **What's your perspective on social acceptance regarding said skills?** | 80.0 % | 20.0 % | 7.5% | 22.5 % | 50.0% | 15.0 % | 5.0% |
| **13** | **Do you think Vocational staff have enough training/ workshops** | 67.5 % | 32.5 % | 7.5% | 27.5 % | 32.5% | 12.5 % | 20.0 % |

| | |
|---|---|
| **regarding new textile skills?** | |

## DISCUSSION

Design undermines skilled collaborative efforts in the context of fabric qualification and personal talents for creative working. Clothing is vital in adjusting to life in the modern world. The surface of the cloth is a critical component in fashion design. Textile abilities must be acknowledged to meet the end user's or market's needs. Marbling and smocking are two methods for creating a surface design. These indispensable textile aesthetic instruments add value to fashion outfits and are necessary for the styling of home textile products.

Textile curriculum that integrates study and application are available through vocational education. Regarding textile design education, the next generation must master new and innovative techniques and skills for garment and clothing surface design. An adequate understanding of structures and skill sets is required to transform a country's vision of profitable development into reality. Furthermore, vocational schools offer skills linked to textile and apparel making, which are beneficial to entrepreneurship and the socioeconomic advancement of the country in person. New skills should be provided based on consumer demand and learner desire for this objective.

Cotton and silk fabrics were used to create marbling and smocking samples. I was keeping in mind the interests of the consumer's demand. Smocking was done on silk because it is the most substantial fabric and has an aesthetic effect. Marbling was done on cotton and silk using acrylic paints. After thickening the water density using corn starch, the paint could stay on the water's surface.

Those samples were evaluated in laboratories according to international standards to determine their physical qualities and performance regarding potential consumption. The color fastness of the marbling samples was good for rubbing, washing, and light fastness. In addition, the elongation of the smocking has been assessed to determine the weight at which it will disintegrate. A variety of marbling and smocking designs were made to test the perception of teachers and heads of departments towards surface designing related to said skills, such as teaching textile skills, with the help of a self-generated questionnaire. The inquiries centered on surface design, textile skills, and vocational institutes.

The final evaluation of the research study is linked to the perceived and acceptance of stated skills in vocational institutions. Certain vocational institutes have built

courses for innovative textile skills, and there are variances in skills taught in rural and urban vocational centers. Because of limited resources, some teachers argued that these competencies should be re-established in the curriculum. However, according to a survey, teachers believe that the government has no formal policy targeting these talents and that the workshops and resources already available in the institutions need to be evolved. The appropriate tests are performed on the survey results. The frequency table provides an evaluation of the final findings of statistical tables. These tables show the percentage rating of the general population for each question statement and sample under consideration.

This current study topic has been selected for the ongoing development of creative and distinctive textile ability in surface design using marbling and smocking with exciting textures and attractive designs. The unique notion of dealing with smocking on silk cloth and marbling on cotton and silk and incorporating it into the curriculum of vocational institutes suggested. The development of samples was assessed using specific criteria to determine the general adoption of this concept in vocational institute curricula. The smocking and marbling samples were tested at textile testing laboratories for physical qualities and performance, and the results were all good for coloring fastness elements, with silk being the most vital fabric for the smocking. The results of the final evaluation of the survey related to the perception and acceptance of said skills in vocational institutes. Some vocational institutes have established programs for innovative textile skills, and there are differences in skills taught in rural and urban vocational centers. Due to limited resources, some teachers believed these abilities should be reinstated in the curriculum. However, according to a survey, teachers feel the government has no explicit policy addressing these abilities and that the institutes' workshops and resources must be revised.

## RECOMMENDATIONS

More innovative textile skills should be introduced in the vocational institutes of Pakistan.
Different mediums should also be tested on the fabric for marbling, i.e., oil paints and spray paints. Watercolors etc.
Marbling paints should be introduced separately in Pakistan for fabric marbling.
Different agents should be used and tested for the thickening of the water surface.
More research should be done to improve Pakistan's vocational institutes.

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