

## EFFECTIVENESS OF TIE-AND-DYE TRAINING IN ENHANCING TECHNICAL COMPETENCIES AND ENTREPRENEURIAL READINESS AMONG UNDERGRADUATE STUDENTS IN MAKURDI, NIGERIA

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### ABSTRACT

*This study evaluated the effectiveness of a structured tie-and-dye entrepreneurship training programme in enhancing the technical competencies and entrepreneurial readiness of undergraduate students. The study was motivated by the need to equip university students with practical textile production and enterprise development competencies required for self-employment and sustainable participation in the creative economy. A one-group pretest–posttest quasi-experimental design was adopted. The study was conducted at Joseph Sarwuan Tarka University, Makurdi, Nigeria, involving 30 purposively selected undergraduate students drawn from a population of 340 students. Data were collected using the researcher-developed Tie-and-Dye Knowledge Assessment Questionnaire (TDKAQ), which had a Cronbach's alpha reliability coefficient of 0.82. Descriptive statistics comprising mean and mean gain were used to answer the research questions. The findings revealed substantial improvements in participants' competencies in basic tie-and-dye production procedures, fabric preparation and folding techniques, dye preparation and colour application, tie-and-dye product construction, and product quality evaluation and creative design. The post-training assessment also showed that participants demonstrated a high level of entrepreneurial readiness, particularly in costing, pricing, branding, marketing, customer identification, and business planning. The study concludes that structured, competency-based tie-and-dye entrepreneurship training is an effective approach for developing technical competencies and entrepreneurial readiness among undergraduate students. It is recommended that universities integrate structured textile entrepreneurship training into undergraduate entrepreneurship programmes to promote graduate employability, enterprise creation, and sustainable development within the textile and creative industries.*

**Keywords:** Tie-and-dye Entrepreneurship, Technical Competencies, Entrepreneurial Readiness, Competency-based Training

## INTRODUCTION

Entrepreneurship education has become increasingly important in higher education as universities seek to prepare undergraduate students with the practical competencies, innovative thinking, and entrepreneurial capabilities required to respond to changing labour-market conditions and create sustainable livelihood opportunities. Beyond preparing graduates for conventional paid employment, entrepreneurship education encourages creativity, opportunity recognition, problem-solving, resilience, and enterprise creation, enabling students to transform acquired knowledge and skills into viable economic activities. This orientation is particularly important in contexts where graduate employment opportunities are limited and young people are increasingly expected to develop alternative pathways to economic participation and at same time, higher education institutions are placing greater emphasis on practical and experiential approaches that connect classroom learning with real-world enterprise development. These approaches enable students to acquire not only theoretical knowledge but also the confidence and practical competence required to identify opportunities, develop products, and manage emerging ventures (UNESCO, 2024; Bob-Eze, 2023). This broader shift towards practice-oriented entrepreneurship education, practical skill development in creative and production-based disciplines provides an important pathway through which undergraduate students can acquire competencies that are directly applicable to self-employment and enterprise creation.

The textile entrepreneurship provides a valuable pathway for undergraduate students to develop both creative and technical competencies, while learning how textile products can be transformed into marketable goods within this practice-oriented approach. The textile and fashion industries combine design creativity, material knowledge, production skills, innovation, and commercial activity, thereby creating opportunities for students to move from skill acquisition to enterprise development. Practical engagement with textile production can also strengthen students' ability to respond to consumer preferences, add value to locally available materials, and develop products with commercial potential. In Nigeria, the importance of entrepreneurship within clothing and textiles has been linked to the development of practical competencies, enterprise skills, and opportunities for self-employment among students (Boyo & Johnson, 2024; Fadoju et al., 2024). Aize et al. (2024) demonstrated that practical skills development in fashion design can improve participants' production competencies and provide marketable skills that support economic empowerment. These

perspectives suggest that textile entrepreneurship training should extend beyond theoretical knowledge to include structured practical experiences through which students can develop production competence, creativity, and the capacity to translate textile skills into viable entrepreneurial activities.

The effectiveness of structured practical training in developing both technical competencies and entrepreneurial readiness among undergraduate students remains insufficiently documented despite the growing emphasis on entrepreneurship education and the potential of textile-based enterprises,. The existing studies have examined entrepreneurship education in clothing and textiles, practical skills acquisition, indigenous textile production, and the contribution of vocational training to enterprise development (Aize et al., 2024; Boyo & Johnson, 2024; Fadoju et al., 2024; Shobowale, 2023) and much of this evidence has addressed broad entrepreneurship education, skills development, or textile production rather than examining a structured tie-and-dye intervention that combines sequential technical production skills with enterprise-oriented competencies. This creates a need for empirical evidence on whether systematic training in tie-and-dye can improve the practical competencies required for textile production while also preparing undergraduate students to identify opportunities, develop products, and engage in entrepreneurial activities. The present study therefore evaluates the effectiveness of a structured tie-and-dye entrepreneurship training programme in enhancing technical competencies and entrepreneurial readiness among Nigerian university students.

The study addresses this gap by examining the extent to which a structured tie-and-dye entrepreneurship training programme can strengthen undergraduate students' technical competencies and entrepreneurial readiness. The training was designed to provide sequential practical experiences covering basic tie-and-dye production procedures, fabric preparation and folding, dye preparation and colour application, product construction, product quality evaluation and creative design, together with enterprise-oriented competencies. In examining of these areas within a single intervention, the study provides evidence on how practical textile training can support both skill development and preparation for entrepreneurial activity.

## **METHODOLOGY**

This study adopted a one-group pretest–posttest quasi-experimental design to evaluate the effectiveness of a structured tie-and-dye entrepreneurship training programme in enhancing undergraduate students' technical competencies and entrepreneurial readiness. The study was conducted at Joseph Sarwuan Tarka University, Makurdi, Benue State, Nigeria. The target population comprised 340 undergraduate students in the Department of Family and Consumer

Science. A sample of 30 undergraduate students was selected using purposive sampling. The participants were those who enrolled in and completed the structured tie-and-dye entrepreneurship training programme. Data were collected using a researcher-developed instrument titled the Tie-and-Dye Knowledge Assessment Questionnaire (TDKAQ). The instrument was designed to assess undergraduate students' technical competencies and entrepreneurial readiness before and after participation in the training programme. It comprised six competency domains aligned with the objectives of the study and used a four-point rating scale. The response options were scored from 1 to 4, with a criterion mean of 2.50 adopted as the benchmark for decision-making. Mean scores of 2.50 and above indicated satisfactory competency, while scores below 2.50 indicated low competency.

The TDKAQ was subjected to validation by three experts from Joseph Sarwuan Tarka University, Makurdi, comprising one expert from the Department of Entrepreneurship and two experts from the Department of Textiles, Clothing and Interior Decoration. The experts assessed the instrument for its suitability in measuring the technical competencies and entrepreneurial readiness of the undergraduate students. A pilot study was conducted to establish the reliability of the instrument, and the data obtained were subjected to Cronbach's alpha analysis. The analysis produced a reliability coefficient of 0.82, indicating satisfactory internal consistency of the instrument. Data collection involved administering the TDKAQ before and after the structured tie-and-dye entrepreneurship training programme. The collected data were analysed using mean and mean gain, with a criterion mean of 2.50 used for interpreting the responses.

## RESULTS

**Table 1:** Mean Ratings of Undergraduate Students on knowledge of Tie-and-Dye Production Procedures before and after the Structured Tie-and-Dye Entrepreneurship Training Programme

| S/N | Item                                                            | Pretest<br>( $\bar{x}_1$ ) | Posttest<br>( $\bar{x}_2$ ) | Mean<br>( $\Delta\bar{x}$ ) | Gain |
|-----|-----------------------------------------------------------------|----------------------------|-----------------------------|-----------------------------|------|
| 1   | Know of materials used in tie-and-dye production                | 2.94                       | 3.37                        | 0.43                        |      |
| 2   | Know the safety precautions during dye handling                 | 2.94                       | 3.30                        | 0.36                        |      |
| 3   | Know the personal protective equipment's during dyeing          | 3.28                       | 3.43                        | 0.15                        |      |
| 4   | Aware of the effects of improper dye handling on fabric quality | 3.41                       | 3.63                        | 0.22                        |      |
|     | <b>Cluster Mean</b>                                             | <b>3.14</b>                | <b>3.43</b>                 | <b>0.29</b>                 |      |

**Table 2:** Mean rating of respondents on fabric preparation and folding Techniques before and after the training

| S/N                 | Item                                                                             | Pretest<br>( $\bar{x}_1$ ) | Posttest<br>( $\bar{x}_2$ ) | Mean<br>Gain ( $\Delta\bar{x}$ ) |
|---------------------|----------------------------------------------------------------------------------|----------------------------|-----------------------------|----------------------------------|
| 1                   | Know fabric preparation procedures before dyeing                                 | 2.69                       | 3.33                        | 0.64                             |
| 2                   | Understand basic folding techniques                                              | 2.75                       | 3.37                        | 0.62                             |
| 3                   | Can do advanced folding techniques                                               | 2.38                       | 3.27                        | 0.89                             |
| 4                   | Know influence of folding techniques on pattern formation                        | 2.75                       | 3.27                        | 0.52                             |
| 5                   | Can do spiral, crumple, stripe, and rosette folding patterns                     | 2.19                       | 3.07                        | 0.88                             |
| 6                   | Understand relationship between fabric binding and dye penetration               | 2.59                       | 3.13                        | 0.54                             |
| 7                   | Know differences among folding, tying, and binding techniques                    | 2.75                       | 3.27                        | 0.52                             |
| 8                   | Understand the influence of tying techniques on dye distribution                 | 2.72                       | 3.30                        | 0.58                             |
| 9                   | Knowledge of the relationship between folding techniques and pattern development | 2.88                       | 3.43                        | 0.55                             |
| 10                  | Knowledge of the correct sequence of fabric preparation                          | 2.59                       | 3.30                        | 0.71                             |
| 11                  | Understand common errors during fabric preparation                               | 2.53                       | 3.27                        | 0.74                             |
| 12                  | Knowledge of factors influencing colour consistency and pattern clarity          | 2.59                       | 3.47                        | 0.88                             |
| 13                  | Awareness of fabric types suitable for tie-and-dye production                    | 2.50                       | 3.30                        | 0.80                             |
| <b>Cluster Mean</b> |                                                                                  | <b>2.61</b>                | <b>3.31</b>                 | <b>0.70</b>                      |

**Table 3.** Mean rating of Participants on Knowledge of Dye Preparation and Colour Application before and after the training

| S/N | Item                                            | Pretest<br>( $\bar{x}_1$ ) | Posttest<br>( $\bar{x}_2$ ) | Mean<br>Gain ( $\Delta\bar{x}$ ) |
|-----|-------------------------------------------------|----------------------------|-----------------------------|----------------------------------|
| 1   | Know the recommended dye preparation procedures | 2.56                       | 3.40                        | 0.84                             |
| 2   | Know appropriate dyes for cotton fabrics        | 2.53                       | 3.40                        | 0.87                             |
| 3   | aware of the correct dye concentration          | 2.37                       | 3.37                        | 1.00                             |

|    |                                                  |             |             |             |
|----|--------------------------------------------------|-------------|-------------|-------------|
| 4  | apply colour mixing principles                   | 2.75        | 3.40        | 0.65        |
| 5  | produce colour combinations on finished fabrics  | 2.47        | 3.40        | 0.93        |
| 6  | Can select colour for different textile products | 2.68        | 3.33        | 0.65        |
| 7  | predict colour outcomes before dye application   | 2.44        | 3.43        | 0.99        |
| 8  | Know of uniform dye application techniques       | 2.66        | 3.53        | 0.87        |
| 9  | Know the methods for preventing colour bleeding  | 2.63        | 3.27        | 0.64        |
| 10 | Know techniques for controlling dye penetration  | 2.66        | 3.27        | 0.61        |
| 11 | do multiple-colour application techniques        | 2.65        | 3.32        | 0.67        |
|    | <b>Cluster Mean</b>                              | <b>2.58</b> | <b>3.38</b> | <b>0.80</b> |

**Table 4.** Mean responses on Knowledge of Tie and Dye Product Construction before and after the training

| S/N | Item                                                        | Pretest<br>( $\bar{x}_1$ ) | Posttest<br>( $\bar{x}_2$ ) | Mean<br>( $\Delta\bar{x}$ ) | Gain |
|-----|-------------------------------------------------------------|----------------------------|-----------------------------|-----------------------------|------|
| 1   | convert dyed fabrics into finished products                 | 2.41                       | 3.60                        | 1.19                        |      |
| 2   | Know of fabric quantity requirements for different products | 2.47                       | 3.30                        | 0.83                        |      |
| 3   | Know of production planning before product construction     | 2.63                       | 3.30                        | 0.67                        |      |
| 4   | prepare dyed fabrics before cutting                         | 2.56                       | 3.43                        | 0.87                        |      |
| 5   | Know of appropriate cutting procedures                      | 2.47                       | 3.30                        | 0.83                        |      |
| 6   | Know the ironing and finishing techniques                   | 2.88                       | 3.40                        | 0.52                        |      |
|     | <b>Cluster Mean</b>                                         | <b>2.57</b>                | <b>3.39</b>                 | <b>0.82</b>                 |      |

**Table 5.** Mean Ratings of Undergraduate Students on Product Quality Evaluation and Creative Design before and after the Structured Tie-and-Dye Entrepreneurship Training Programme

| S/N | Item                                                            | Pretest<br>( $\bar{x}_1$ ) | Posttest<br>( $\bar{x}_2$ ) | Mean<br>Gain<br>( $\Delta\bar{x}$ ) |
|-----|-----------------------------------------------------------------|----------------------------|-----------------------------|-------------------------------------|
| 1   | identify defects in finished tie-and-dye products               | 2.63                       | 3.13                        | 0.50                                |
| 2   | corrective measures for improving product quality               | 2.50                       | 3.37                        | 0.87                                |
| 3   | evaluate the neatness of finished products                      | 2.88                       | 3.43                        | 0.55                                |
| 4   | quality characteristics of tie-and-dye products                 | 2.72                       | 3.27                        | 0.55                                |
| 5   | factors influencing customer acceptance of tie-and-dye products | 3.03                       | 3.40                        | 0.37                                |
| 6   | combine colours and patterns for improved aesthetics            | 2.58                       | 3.31                        | 0.73                                |
| 7   | modify products to meet customer preferences                    | 2.66                       | 3.43                        | 0.77                                |
| 8   | creative design principles in tie-and-dye production            | 2.72                       | 3.40                        | 0.68                                |
| 9   | select appropriate products based on fabric design              | 2.69                       | 3.33                        | 0.64                                |
|     | <b>Cluster Mean</b>                                             | <b>2.71</b>                | <b>3.34</b>                 | <b>0.63</b>                         |

**Table 6:** Post-Training Entrepreneurial Readiness of Undergraduate Students Following the Structured Tie-and-Dye Entrepreneurship Training Programme

| S/N | Entrepreneurial Readiness Item                      | Mean ( $\bar{x}$ ) |
|-----|-----------------------------------------------------|--------------------|
| 1   | Estimate the cost of producing tie-and-dye products | 3.47               |
| 2   | Calculate the cost of materials used in production  | 3.50               |
| 3   | Determine appropriate selling prices                | 3.45               |
| 4   | Know appropriate product packaging techniques       | 3.27               |
| 5   | Develop branding strategies                         | 3.37               |
| 6   | Identify potential customers                        | 3.50               |
| 7   | Identify appropriate marketing outlets              | 3.43               |
| 8   | Utilize social media for marketing                  | 2.85               |
| 9   | Establish a small scale a tie-and-dye enterprise    | 3.43               |
| 10  | Identify business opportunities                     | 3.50               |
| 11  | Prepare a simple business plan                      | 3.37               |
| 12  | Collaborate with tie-and-dye enterprises            | 3.40               |

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**Cluster Mean****3.38**

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## **Discussion**

The findings in table 1 shows an improvement in undergraduate students' basic tie-and-dye production competencies, with the cluster mean increasing from 3.14 to 3.43. This suggests that the structured practical training strengthened students' understanding of production materials, safety measures, and dye handling. The finding agrees with Bob-Eze (2023), Boyo and Johnson (2024), Fadoju et al. (2024), and Aize et al. (2024), who emphasized the contribution of practical clothing and textile training to technical skill development and preparedness for self-employment. The improvement may be attributed to the demonstrations, guided practice, and supervised activities used during the training. Therefore, Table 1 supports the effectiveness of structured practical training in developing foundational competencies for undergraduate textile entrepreneurship.

The results in table two shows that undergraduate students' competencies in fabric preparation and folding techniques improved following the training, with the cluster mean increasing from 2.61 to 3.31, representing a mean gain of 0.70. The improvement indicates that the practical training strengthened students' ability to prepare fabrics and apply different folding, tying, and binding techniques for pattern development. This finding agrees with Shobowale (2023), who emphasized the importance of fabric preparation and resist techniques in producing quality indigenous textile products. It also supports Fadoju et al. (2024) and Boyo and Johnson (2024), who highlighted the value of practical engagement in developing technical competencies in clothing and textile production. The improvement may be attributed to the repeated demonstrations and supervised practical exercises provided during the training. The findings in table two demonstrates the value of structured practical instruction in developing fabric preparation and pattern-making competencies required for textile entrepreneurship.

The findings in table three shows that undergraduate students' competencies in dye preparation and colour application improved after the training, with the cluster mean increasing from 2.58 to 3.38, representing a mean gain of 0.80. The improvement indicates stronger competence in dye preparation, concentration, colour mixing, colour selection, and uniform dye application. This finding agrees with Shobowale (2023), who emphasized the importance of dyeing techniques and colour combinations in producing quality and marketable indigenous textile products. It also supports Fadoju et al. (2024) and Bob-Eze (2023), who highlighted practical training as an important means of strengthening technical competencies and enterprise-related skills in clothing and textiles. The improvement may be linked to the demonstrations, supervised dyeing exercises, and repeated

practical application provided during the training. The data in table three demonstrates that structured practical training can strengthen students' dye preparation and colour application competencies for textile product development.

Table 4 shows that undergraduate students' competencies in tie-and-dye product construction improved following the training, with the cluster mean increasing from 2.57 to 3.39, representing a mean gain of 0.82. The improvement indicates stronger ability to plan production, prepare and cut dyed fabrics, and transform them into finished products. This finding agrees with Aize et al. (2024), who reported that practical fashion design training enhanced production competencies and equipped participants with marketable skills for self-employment. It also supports Komolafe et al. (2024), who found that practical vocational training improved garment-making skills and the quality of finished products. The improvement in table four may be associated with the demonstrations, supervised production activities, and continuous practice incorporated into the training. The finding highlights the value of structured practical training in developing the product-construction skills needed to produce quality and marketable tie-and-dye products.

Table 5 shows that undergraduate students' competencies in product quality evaluation and creative design improved after the training, with the cluster mean increasing from 2.71 to 3.34, representing a mean gain of 0.63. The improvement indicates enhanced ability to identify defects, apply corrective measures, evaluate product neatness, combine colours and patterns, and modify products to suit customer preferences. This finding is consistent with Aize et al. (2024), who reported that practical fashion design training improved participants' creativity and product development competencies. It also agrees with Shobowale (2023), who emphasized the importance of creativity, product quality, and aesthetic value in the marketability of indigenous textile products, and Fadoju et al. (2024), who linked practical clothing and textile training with creativity, quality consciousness, and product innovation. The improvement in Table 5 may be attributed to the practical product evaluation, refinement, and feedback activities incorporated into the training. These finding demonstrates that structured practical training can strengthen students' ability to develop creative, quality-oriented, and marketable textile products.

Table 6 shows that undergraduate students demonstrated a high level of entrepreneurial readiness after the training, with a cluster mean of 3.38, well above the criterion mean of 2.50. The highest mean scores were recorded for calculating production costs, identifying potential customers, and identifying business opportunities (3.50), while social media marketing recorded the lowest mean (2.85), although it remained above the criterion mean. The finding agrees with Aize et al. (2024), who reported that practical fashion design training enhanced entrepreneurial competencies and preparedness for self-employment. It also supports Bob-Eze (2023), who emphasized the

contribution of entrepreneurship-oriented clothing and textile training to enterprise development, and Fadoju et al. (2024), who linked practical entrepreneurship education in clothing and textiles with skills development, self-employment, and economic opportunities. The high level of readiness observed in Table 6 may be associated with the inclusion of practical activities on costing, pricing, branding, marketing, customer identification, and business planning. The finding suggests that structured tie-and-dye training can help undergraduate students translate textile production skills into potential entrepreneurial ventures.

## **CONCLUSION**

This study demonstrated that a structured tie-and-dye entrepreneurship training programme is an effective strategy for enhancing undergraduate students' technical competencies and entrepreneurial readiness. The intervention significantly improved participants' competencies in basic tie-and-dye production procedures, fabric preparation and folding techniques, dye preparation and colour application, product construction, and product quality evaluation and creative design. In addition, the post-training assessment revealed a high level of entrepreneurial readiness, indicating that participants acquired the competencies required to cost, brand, market, and commercialize tie-and-dye products as viable entrepreneurial ventures

## **RECOMMENDATION**

The study recommends that;

- i. Universities should integrate structured tie-and-dye entrepreneurship training into undergraduate entrepreneurship programmes to strengthen students' competencies in basic tie-and-dye production procedures and promote practical skill acquisition for self-employment.
- ii. Competency-based practical instruction in fabric preparation, folding techniques, dye preparation, and colour application should be emphasized to enhance students' technical proficiency and improve the quality and aesthetic value of tie-and-dye products.
- iii. Entrepreneurship training programmes should incorporate practical product construction, quality evaluation, and creative design activities to develop students' capacity to produce innovative, high-quality, and marketable textile products that meet consumer preferences.

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