IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 7, July 2023

DOI: 10.17148/IARJSET.2023.107108

Development of Dress Pattern Maker Software

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Abstract: This study aimed to design, develop dress pattern maker software and evaluate its functionality, accuracy, performance efficiency, and usability. The study was subjected to a technical presentation of a group of technical experts in the field of computers and the dress-making industry was invited to scrutinize the functionality of the study. The system was also subjected to its final evaluation by computer programmers, dressmaking teachers from the academe, practitioners in the industry, as well as dressmaking students for its acceptability. The data-gathering instrument used to evaluate the system was adopted from ISO/IEC 25010 questionnaire and a researcher-made questionnaire that passed the validity and reliability requirements. Data gathering was made online in compliance with the COVID-19 Health and Safety protocols. The testing and evaluation of the software had been conducted from May 26 to June 15, 2021, by the nine (9) dressmaking teachers, seven (7) practitioners, and the fourteen (14) fashion students at Antique, Capiz, Iloilo City, and Iloilo Province Region VI-Western Visayas. The mean average and t-test were used in the interpretation of data based on the criteria on the parameters of the study. The design of the software was made up of computer programs. In the programming language that was used is Visual C#, the Graphics class provides methods for drawing objects to the display device. Many different shapes and lines can be drawn using a Graphics object. These methods include DrawLine, DrawArc, DrawClosedCurve, DrawPolygon, and DrawRectangle. The system was designed to generate a digital system of making dress patterns that will replace the conventional way of making dress patterns. The system produced an accurate and efficient way of drafting the pattern of the front blouse, back blouse, front skirt, back skirt, set-in sleeve, and sports collar. The evaluation revealed that the device was highly acceptable to the respondents in terms of its functionality, accuracy, performance efficiency, and usability. The self-instruction module was highly acceptable in terms of content, organization, presentation, and assessment as evaluated by the end users.

Keywords:dress pattern maker, self-instruction module, dressmaking

I. INTRODUCTION

The garment industry started long before as early as the 18th Century. Clothing was traditionally made at home and gradually the dressmakers began to produce it commercially. Manufacturers of ready-to-wear clothing ensured that the target clientele are satisfied with the products they desired. The production process should come up with the bulk of supplies and demand of the target clients in a given time, occasion, and budget. Visionary learners of basic education as early as Grade 7 started to develop and acquire skills in dressmaking as one of the specializations under the Home Economics learning area. A significant number of secondary and tertiary students opted to specialize in dressmaking as their future job to venture into the garment sector or start a business. Successful couturiers were challenged by the increasing demand for products and services by the growing populace in the technological world.

Computers have transformed the way people conduct business and perform their daily tasks. It could draw, paint, make dress patterns, and do a lot more. Computers have led to the development of new technology for which fashion has not been left out. In advanced countries, most of the fashion and textiles illustration processes have been computerized which makes work fast, convenient, cost effective and increases productivity. Much software is available to fashion designers to perform various tasks such as fashion research, fashion design and illustration, pattern design, patternmaking, textile design, garment construction and production management, marketing, and sales. The field of Clothing and Textiles is no exception. Most developed countries like France, China, and the United States of America, developed their economies through the fashion and textiles industry [1]. The Fashion and Textile industry therefore can be a strong economic force in the country's development when given the needed attention right from the training institutions before students get into the world of work [2].

Young generations were inspired by these statements, thus following the steps of those who are successful garment entrepreneurs. As a college instructor of fashion and apparel, it was noted that the challenges always lie in the accuracy of the fitness of outfits, production, timeline, and skilled manpower. The institution offered high-powered tools and equipment to cope with the demand however, pattern drafting and designing consume production time which push the researcher to conduct a survey on awareness of the digital pattern maker system on the 30 dressmaking teachers teaching the subject and practitioners at Iloilo City and Iloilo Province last November 2019. The survey shows that the teachers and practitioners have less awareness of digital apparel pattern making and its benefits but their responses exhibit

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willingness and interest to explore and understand digital apparel pattern making to refashion the pattern-making process with a computerized aided in the academe as to embrace the industry 4.0 and help address the global market demand of fashion and apparel industries.

This study aims to design, develop and evaluate dress pattern maker software to be used by dressmaking teachers and fashion students with simple, accurate, effective, and less manipulative steps with minimal time spent. The processes involved in drafting patterns are based on the practices of dressmaking teachers with great concern for functionality, accuracy, performance efficiency, and usability.

II. METHODOLOGY

This study entailed designing, developing, and evaluating the dress pattern maker software and determining its acceptability in terms of functionality, accuracy, performance efficiency, and usability. It also aimed to determine the acceptability of the developed dress pattern maker software self-instruction module.

The design of the software was made up of computer programs. In the programming language that was used is Visual C#, the Graphics class provides methods for drawing objects to the display device. Many different shapes and lines can be drawn using a Graphics object. These methods include DrawLine, DrawArc, DrawClosedCurve, DrawPolygon, and DrawRectangle. The system was designed to generate a digital system of making patterns that will replace the conventional way of making dressmaking patterns.

The study was subjected to a technical presentation by a group of technical experts in the field of computers and the dress-making industry invited to scrutinize the functionality of the study.

The system was also subjected to its final evaluation by computer programmers, dressmaking teachers from the academe, practitioners in the industry, as well as dressmaking students for its acceptability. The data-gathering instrument used to evaluate the system was adopted from ISO/IEC 25010 questionnaire and a researcher-made questionnaire that passed the validity and reliability requirements. Data gathering was made online in compliance with the COVID-19 Health and Safety protocols.

III. RESULTS AND DISCUSSION

The study aimed to design and develop the dress pattern maker software to evaluate its functionality, reliability, security, and maintainability and to determine the level of acceptability of the developed dress pattern maker software in terms of functionality, accuracy, performance efficiency, and usability and to determine the level of acceptability of the self-instructional module in terms of content, organization and presentation, and assessment.

The functionality of the developed dress pattern maker software evaluated by the computer expert was rated as “highly functional” based on the (M= 4.80, SD =0.20). It implies that the software has the characteristics of functional completeness where the system’s set of functions covers all the specified tasks and user objectives. Likewise, functional correctness provides the correct results with the needed degree of precision and functional appropriateness wherein its function is to facilitate the accomplishment of specified tasks and objectives.

Also for the reliability of the developed dress pattern maker software, computer experts evaluated the developed dress pattern maker software as “reliable” based on the (M= 4.45, SD =0.38). It implies that the software has maturity characteristics that its system is reliable under normal operation, and availability that the system is reliable in times it is required to be used. Likewise, it has fault tolerance that can operate as intended despite the presence of hardware or software faults and recoverability in the event of an interruption or a failure, the system can recover the data directly affected and re-establish the desired state of the system.

Furthermore, for the security of the developed dress pattern maker software the computer expert evaluated the developed dress pattern maker software as “secure” based on the (M= 4.48, SD =0.30). It implies that the software has the confidentiality characteristics that its system ensures that data are accessible only to those authorized to have access and also integrity that its system prevents unauthorized access to or modification of, computer programs or data, non-repudiation that the system can records transactions and can be proven to have taken place so that the transactions cannot be repudiated later. Likewise, accountability that the transactions can be traced uniquely to the entity, and the authenticity that the identity/function of the resource is the same as it was discussed.

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Moreover, the computer expert evaluated the developed dress pattern maker software as "highly reliable" based on the (M= 4.84, SD =0.09). It implies that the software has the modularity characteristics that the system is composed of discrete components such that a change to one component has minimal impact on other components, also reusability that the part of a system can be used in more than one system, or in building other systems. Similarly, analysability that the impact of the intended change to one or more parts of the system can be assessed, diagnosed for deficiencies or failures, or identified on which parts to be modified. Likewise, the modifiability of the system can effectively and efficiently modify the defects or degrade existing quality. Likewise, testability is that the test criteria can be established for the system and tests can be performed to determine whether those criteria have been met.

Table 1. Evaluation of the developed dress pattern maker software in terms of functionality, reliability, security, and maintainability by the computer programmer

Variables	M	SD	VI
Functionality	4.80	0.20	HA
Reliability	4.45	0.38	A
Security	4.48	0.30	A
Maintainability	4.84	0.09	HA
Over All Mean	**4.64**	**0.21**	**HA**

The acceptability of the developed dress pattern maker software in terms of functionality, accuracy, performance efficiency, and usability was evaluated by the teachers, practitioners, and students. Assessment reveals that the developed dress pattern maker software the overall mean rating of functionality was (M =4. 79, SD =0.28). This means that the developed dress pattern maker software is "Highly Acceptable" to teachers, practitioners, and students.

The result of the evaluation of the developed dress pattern maker software as to its functionality by the three types of respondents the practitioners gave the highest rating (M = 4.89(M= 4.80, SD =0.16), students gave the rating (M = 4.76, SD =0.39) while the teachers gave the least rating (M = 4.73, SD =0.28). Their ratings however showed that all groups strongly agreed as to the functionality of the software which implied that the developed dress pattern maker software was "highly acceptable".

This implies that the software is capable to illustrates the given body measurement of the client to become an apparel pattern, to re-size and alter the apparel pattern, adding different patterns, drawing lines in the pattern and managing patterns, previewing the pattern on the screen, and printing the pattern.

As to the accuracy of the developed dress pattern maker software, the respondent's evaluation of the software was "Highly Acceptable" with an overall mean rating of (M = 4.75, SD =0.31). However, when the groups of evaluators were compared, the practitioners have the highest level of acceptance (M=4.86, SD =0.30) than the two other groups of respondents where the students rated (M=4.80, SD =0.29) while the teachers rated (M=4.60, SD =0.33). The respondents evaluated the software as "Highly Acceptable" which implies that the software can generate dress patterns based on steps and procedures, ensures the validity of apparel patterns, records customers' data, records data in real-time, and produces precise apparel output.

In terms of performance efficiency, the respondent's evaluation of the software was "Highly Acceptable". The overall rating was (Mean = 4.63, SD =0.37) which shows that they strongly agreed that the software was performing efficiently as designed. However when the group of respondents evaluated the developed dress pattern maker software, the practitioner rated (M=4.77, SD =0.29) and the students rated (M=4.57, SD =0.44) while the teachers rated (M=4.56, SD =0.38) that means the developed dress pattern maker software is "highly acceptable". This implies that the quality or the level of performance of the software can illustrate the desired data in near real-time. Moreover, the time behavior of the software is responsive and the processing times throughput meet requirements. Likewise, the resource utilization of the software refers to the amounts and types of resources used by the system that satisfy the demands. Furthermore, the capacity of the software to the maximum limits of a product or system parameter is sufficient, and the steps are easy to follow and execute.

The respondents' evaluation as to the usability of the developed dress pattern maker software revealed that it was "highly acceptable" with an overall mean rating (Mean = 4.60, SD =0.36) which shows that they strongly agreed on the design. When the group of respondents evaluated the developed dress pattern maker software the practitioner rated it with the

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highest value (M=4.69, SD =0.22) with the students (M=4.67, SD =0.39) while the teacher (M=4.44, SD =0.47) a little least compare from the two group of evaluators. However, the three groups of evaluators rated the developed dress pattern maker software as "highly acceptable". It implies that the software has the appropriateness recognisability qualities that the users can recognize the appropriate need of the kiosk system, also the learnability that users can use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use to achieve specified goals of learning. Likewise, the device's operability is easy to operate and control. Furthermore, it has user error protection that the system can protect users against making errors and have user interface aesthetics that the user interface enables pleasing and satisfying interaction.

Table 2. Evaluation of the developed dress pattern maker software in terms of functionality, accuracy, performance, efficiency and usability by the respondents

Variables	Teachers			Practitioner			Student			OverAll Mean		
	M	SD	VI	M	SD	VI	M	SD	VI	M	SD	VI
Functionality	4.73	0.28	HA	4.89	0.16	HA	4.76	0.39	HA	4.79	0.28	HA
Accuracy	4.60	0.33	HA	4.86	0.30	HA	4.80	0.29	HA	4.75	0.31	HA
Performance Efficiency	4.56	0.38	HA	4.77	0.29	HA	4.57	0.44	HA	4.63	0.37	HA
Usability	4.44	0.47	A	4.69	0.22	HA	4.67	0.39	HA	4.60	0.36	HA
Over All Mean	4.58	0.37	HA	4.80	0.24	HA	4.7	0.38	HA	4.69	0.33	HA

The table showed that the overall rating of the content of the developed dress pattern maker software of the self-instructional module (M=4.67, SD =0.39). This means that the module is "Highly Acceptable" to the three groups of respondents the teachers, practitioners, and students. However, when the three groups of evaluators were compared the practitioners had a higher level of acceptance (M=4.82, SD =0.24) than the students (M=4.66, SD =0.46), and the teachers had the lowest rate of acceptance which is (M=4.53, SD =0.48). This implies that the develop the dress pattern maker software self-instructional module meets the needs of individual learners with various skills level, enhances conceptual understanding and engages higher order thinking skills, provides drill in basic skills, promotes manipulation of data and digital information, and encourages personal responsibility for learning. Also, the result showed that the overall rating of the organization and the presentation of the module (M=4.60, SD =0.37). This means the module was "Highly Acceptable" to three groups of evaluators the teachers, practitioners, and students.

However, when the three groups of evaluation were compared students had a higher level of acceptance (M = 4.70, SD =0.39) than the practitioners (M = 4.64, SD =0.28) while the teachers had the lowest evaluation (M=4.47, SD =0.44). This means that both the students and practitioners have most the same acceptance of the developed dress pattern maker software self-instructional module of organization and presentation. This implies that the module is user-friendly to facilitate, and interact with and will provide high-quality sensory experiences for all users, and able to provide independent study to students that have communicative content, clear directions, understandable and distinguish between important and trivial information. As to the acceptability of the module in terms of organization and presentation the module was "Highly Acceptable" to the students and practitioners and acceptable only to the teachers. One of the techniques using computers in manufacturing is CAD in apparel and textiles. The system writer was provided with a good specification to use as the foundation for the documentation that the system builder required. The goal is to lay down pattern pieces on the cloth while minimizing waste and immediately identifying the input and output processes [3]. Likewise, Overall CAD saves time during the design process, helps to create new design ideas, shows every design component, develops a prototype and helps to amend the new design before production according to [4]

Additionally, for the assessment, the overall mean rating for the acceptability of the module was (M = 4.71, SD =0.37). When the ratings of three groups of evaluators were compared the practitioners had a higher level of acceptance (M=4.80, SD =0.28) than the students (M=4.63, SD =0.41) while the teachers had rated (M=4.69, SD =0.41). This means that the group of respondents evaluated the developed dress pattern maker software self-instructional module as "Highly Acceptable". This implies that the module has an observable performance that is relevant to real-world experience and that can be used to measure student engagement, assessment methods are appropriate and suited to the learning objectives, suited to goals and student ability, and easily assesses what has been learned. It keeps an ongoing record of students' progress and allows the teacher full access to individual student monitoring of activities, assignments, assessments, and

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grades. The pre and post-assessments positive, meaningful feedback, and prescriptive guides for remediation were provided.

Table 3. Evaluation of the developed dress pattern maker software module in terms of content, organization and presentation, and assessment by the respondents.

Variables	Teachers			Practitioner			Student			Over All Mean		
	M	SD	VI	M	SD	VI	M	SD	VI	M	SD	VI
Content	4.53	0.48	HA	4.82	0.24	HA	4.66	0.46	HA	4.67	0.39	HA
Organization and Presentation	4.47	0.44	A	4.64	0.28	HA	4.70	0.39	HA	4.60	0.37	HA
Assessment	4.69	0.41	HA	4.80	0.28	HA	4.63	0.41	HA	4.71	0.37	HA
Over All Mean	4.56	0.44	HA	4.75	0.27	HA	4.66	0.42	HA	4.66	0.38	HA

IV. CONCLUSION

Based on the findings of the study the following conclusions were drawn:

The Dress Pattern Maker Software was able to function according to its purpose.

The software can be used to generate dress patterns using traditional procedures on dress pattern making. The Dress Pattern Maker Software is user-friendly with easy-to-follow steps provided in the self-instruction module. The Dress Pattern Maker Software was useful for helping the students draft dress patterns accurately, quickly, and with consistent quality.

V. RECOMMENDATIONS

For the usefulness and utilization of the developed dress pattern maker software, the following recommendations were offered; the technology should be made available to the market for its usefulness to the dressmaking businesses. Likewise, the software should be made available for use of dressmaking teachers, practitioners, and fashion students. Further development of the study was encouraged to include more patterns and designs that can be generated for the industry's mass productions.

Development of dress pattern maker software may be protected upon review by the expert of the Intellectual Property Management Office (IPMO) and by sending an application for Intellectual Property Rights or Patent Application thru IPOPHIL National.

Further study was to include a Plotter device for the printing of the conceptualized pattern from the dress pattern maker software for the hands-on activity of both teachers and students in dressmaking.

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