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Design and Quality Analysis of *Nara Sela* Contemporary Fashion with QR Code Based Interactive Fashion

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ABSTRACT - The development of the fashion industry in the digital age has encouraged the incorporation of interactive technology into contemporary fashion design. This study aims to (1) describe the design process of contemporary fashion of *Nara Sela* and (2) analyze its quality through the application of interactive features based on QR codes. The research uses the Research and Development (R&D) method using the PPE (Planning, Production, and Evaluation) development model. Data were collected through observation sheets involving five expert panelists and twenty trained panelists and analyzed using descriptive quantitative techniques. The results of the study show that 1) *Nara Sela* fashion design integrates QR codes as an integral design element rather than just serving as an information label. Digital content accessed through QR codes includes design concept narratives, fashion visuals, and photo and video documentation, which adds value by enhancing the user experience. 2) the results of the evaluation show that the quality of *Nara Sela*'s fashion is categorized as very feasible based on aspects of design, aesthetics, sewing techniques, performance, and uniqueness. These findings have implications for the development of fashion education and digital fashion, particularly in promoting innovation in contemporary fashion that integrates aesthetic values with interactive user experiences.

Keywords: QR code, quality, interactive fashion.

INTRODUCTION

The fashion industry in the modern era has experienced very rapid development. These developments extend not only to aesthetics and fashion functions, but also to innovation and the utilization of digital technology. The development of technology makes it easier for a person to see someone's point of view through fashion globally through fashion, so that fashion can be assumed as a medium of communication. (Yessica & Utami, 2025). Fashion is a form of visual communication that can convey identity, values, and cultural messages to the wider community. (Hakim & Mansur, 2024). Nowadays, a designer is required to be able to combine artistic creativity with the ability to adapt to technological developments that continue to change.

Contemporary fashion is a form of design development with a modern approach. Contemporary has the meaning of contemporary, modern, or something similar to the current conditions of time, so contemporary art is an art that develops according to the present times (Jannah et al., 2025). The development of the 4.0 Revolution has encouraged the integration of technology into various fields, including the fashion industry. These developments are not only in terms of aesthetics and fashion functions, but also in terms of innovation and the use of digital technology. Digital advances that occur in various areas of life also encourage the emergence of interactive fashion concepts, which can provide a user experience. User Experience (UX) is an approach in the field of design that focuses on the interaction between products as design objects, people using the product, and the resulting experience (Kim & Ha, 2021).

One form of application of digital technology in the world of fashion that is starting to develop is the use of QR Codes or Quick Response Codes. QR Code is a two-dimensional matrix developed by Denso Wave, from Denso

Corporation, one of the companies in Japan that has the ability to store data in it (Herlina et al., 2017). The use of technology such as QR Code can be a decorative element as well as an information medium in fashion design (Vorobchuk et al., 2023). QR Codes on fashion allow designers to add video content, URLs, and documents (Mustafa et al., 2025), allowing users to scan parts of the fashion and access digital content, such as the story behind the design, the meaning of the motif, or the cultural message the designer wants to convey.

In previous research, QR Code has been used by several international designers and brands as a decorative element as well as a communication medium. Some examples of its application are: clothes designed by Julie Helles Eriksen which are made with fabric patterned with QR Codes. The jersey of the Tromso IL football club at the time of the 2022 FIFA World Cup also utilized QR Codes for social campaigns. The QR Code on the jersey, if scanned, will be linked to the human rights information page. In 2023, Ludic Pattern created a QR dress. When the QR Code on this dress is scanned, an image from the painting The Birth of Venus by Sandro Botticelli will appear (Vorobchuk et al., 2023). In previous research conducted by Vorobchuk, QR Codes were used as decorative elements or as part of product design as well as interactive media.

The research entitled The Application of Quick Response Code (QR Code) Labels on Basiba Songket Silungkang Baju Kurung Products as Product Information Media in the Industrial Era 4.0, QR Code is used as a medium for delivering product information that displays digital infographics containing the philosophy, motifs, patterns, and processes of making baju kuru. In the study, QR Code was applied to the back neck of the fashion using Direct-to-Film (DTF) stickers, was still limited to informative functions and placed on the label, and was not part of the fashion design itself (Ayunda, 2024).

Based on these two studies, it can be identified that there is a research gap in the application of QR Codes in clothing. In the research conducted by Vorobchuk, it highlighted several designers' works that integrate QR Codes in clothing, but the study only emphasizes the potential use of QR Codes in clothing without discussing in depth the fashion design process. Meanwhile, in the research conducted by Ayunda, QR Code only acts as an interactive media in the form of labels, so it has not been integrated as part of fashion design. Previous research has proven the potential application of QR Code technology in clothing, but there has been no research that analyzes the quality of the work and the process of designing contemporary fashion with QR Code integration. Therefore, *Nara Sela* clothing was created as a response to the research gap, by integrating QR Codes as decorations on the back of the clothing, as well as as an interactive media with content containing fashion information that can be accessed through QR Codes.

Nara Sela's contemporary fashion is a work designed and developed in the Degree Karya course project as a form of creative exploration in creating fashion with the addition of elements of technological advancement. This work is an interactive and adaptive fashion design for the times. Although the work has been displayed at the 2025 Gelar Karya Karya Rumpun PKK fashion show, until now there has been no research on the design process and analysis of the quality and feasibility of *Nara Sela* clothing.

Fashion design is a creative process in producing a complete fashion work. The initial stage of fashion design begins with the search for basic ideas or concepts that are the main direction of design. The source of an idea is anything that can cause a stimulus for the birth of a creation (Purnami et al., 2023). In contemporary fashion, the process of concept discovery tends to be more exploratory and flexible due to the wide space for aesthetic interpretation. Contemporary works require the analysis of ideas and exploration of techniques as the foundation of design (Jannah et al., 2025). Product quality, according to Kotler and Keller, is a product's ability to perform its function, that ability includes durability, reliability, precision, which the product as a whole is obtained (Wardhani, 2024). Research on the design and analysis of the quality of *Nara Sela* clothing is important, because there are still limited scientific studies that review the quality of clothing with the integration of interactive technology as a whole.

The formulation of this research problem is: 1) How is the process of designing contemporary fashion *Nara Sela* with the integration of QR Code-based interactive technology? and 2) How is the quality of *Nara Sela*'s contemporary fashion with the integration of QR Code-based interactive technology?

This research aims to 1) Explain the process of designing contemporary *Nara Sela* fashion that integrates QR Code interactive technology, and 2) Analyze the quality of *Nara Sela* fashion using assessment instruments that include several aspects, namely design, aesthetics, sewing techniques and finishes, performance or overall appearance, and uniqueness. Through this assessment instrument, it is hoped that the extent of the quality of *Nara Sela*'s fashion in meeting the feasibility standards of creative, functional, and aesthetic fashion can be known, as well as relevant to technological developments in today's fashion world.

Academically, this research has an urgency in the development of fashion education by showing the use of interactive technology as a learning medium that presents documentation of creative processes, presentation of design

concepts, and systematic analysis of fashion quality. Thus, this research is not only oriented to product innovation, but also provides a theoretical contribution in education and fashion design practices in the digital era.

METHOD

This research uses research and development (R&D) methods with a PPE (Planning, Production, Evaluation) development model. Research and development (R&D), according to Sugiyono, is a research method used to produce certain products and test the effectiveness of products (Nasution, 2024). Research and development methods are characterized by designing and developing products, testing products, and validating products (Jul 2024). This research model adopts Richey and Klein's research and development with a research focus that is analytical from start to finish or better known as the PPE model (Women's 2023).

This approach was chosen because the research focuses on the process of designing contemporary fashion with the integration of interactive technology in the form of QR Codes. In addition to producing works, this study also analyzes the quality of fashion to determine the level of feasibility and product quality based on aspects of design, aesthetics, sewing and finishing techniques, fashion performance, and uniqueness. This research was carried out through three stages, namely the planning, production, and evaluation stages. According to Sugiyono, planning is the initial stage in making clothes, production is the process of creating goods, and evaluation is evaluation and tests to measure how well a product performs (Women's 2023).

The data used in this study consists of qualitative data and quantitative data obtained from various sources according to the needs of the research. A data source is a source that allows a researcher to obtain the amount of information or data needed in a study (Ramlah, 2022). The data sources of this research are in the form of: 1) Primary Data Sources, which come from the design process carried out by the researcher, using personal documentation, the results of expert panelists' assessments in the field of fashion, and the results of instrument validation by validators. 2) Secondary Data Sources, in the form of data sourced from books, articles or journals, as well as previous research that supports *Nara Sela* fashion research.

Qualitative data was used to describe the process of designing contemporary fashion at *Nara Sela* with the integration of QR Code-based interactive technology. This data includes information about design ideas and concepts, moodboard preparation, sketch development, fashion construction process, fittings, QR Code application, and visual documentation at each design stage. In addition, qualitative data was also obtained through direct observation during the fashion making process, guidance notes with the teaching lecturer, input from guest lecturers or Prigel partners, and documentation of Title Karya activities as part of the final presentation of the work.

Meanwhile, quantitative data in this study was obtained through a fashion quality assessment using research instruments that have been compiled based on five assessment indicators, namely design, aesthetics, sewing techniques, fashion performance, and uniqueness. Quantitative data is in the form of assessment scores with a likert scale filled in by expert panelists and trained panelists who have competence in the field of fashion. In addition, quantitative data also includes the results of the validation of assessment instruments provided by expert validators, who assess the feasibility of indicators, the clarity of assessment items, and the suitability of the instruments for the purpose of research.

The research instrument for the Design and Quality Analysis of *Nara Sela* Contemporary Fashion with the Integration of Qr-Code-Based Interactive Technology has been validated by 4 expert panelists, Godham Eko Saputro, S.Sn., M.Ds., A. Imartini, S.Pd., Anik Supriyati, S.Pd., and Rina Purwanti, S.Pd., M.Si, using the Aiken's V formula as follows:

$$\mathbf{V} = \frac{\sum \mathbf{s}}{\mathbf{n(c-1)}}$$

Description:

V	:	Aiken validity index
S	:	R – lo
r	:	Validator-provided score
the	:	Lowest score
n	:	Number of validators
c	:	Number of categories of the likert scale

TABLE 1. Instrument validity criteria.

Range	Criteria
0.00 – 0.19	Very low degree of validity
0.02 – 0.39	Low degree of validity
0.40 – 0.59	Medium degree of validity
0.60 – 0.79	High degree of validity
0.80 – 1.00	Very high degree of validity

(Women's 2023)

The results of the instrument validity test using Aikens'V showed that most of the indicators obtained a value of V ≥ 0.80 with a very high degree of validity category. One indicator, namely the readability and clarity of the instrument language, obtained a V value of 0.75 with the category of high degree of validity. Overall, the instrument was declared suitable for use as a data collection tool. After validation, the research instrument is tested for reliability to measure the level of consistency of assessments between validators.

TABLE 2. Instrument validity test results.

Aspects Assessed	V	Remarks
Compatibility of indicators with competencies	1.00	Very high degree of validity
Adequacy of the number of evaluation indicators	1.00	Very high degree of validity
Clarity of the formula of each indicator	1.00	Very high degree of validity
Suitability of the rating scale	1.00	Very high degree of validity
Readability and clarity Instrument language	0.75	High degree of validity
Compatibility of the instrument with fashion characteristics	0.83	Very high degree of validity

The results of the instrument reliability test showed a Cronbach's Alpha value of 0.755 which was in the reliability category. The results of the Intraclass Correlation Coefficient (ICC) test with the two-way mixed effects consistency model showed an ICC value of 0.755 on average measures with a significance value of 0.015 (p.0.05). This shows that the assessment instrument has a good level of consistency and agreement between validators, making it suitable for use as a measuring tool in research.

Reliability Statistics

Cronbach's Alpha	N of Items
.755	4

Intraclass Correlation Coefficient

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0		
		Lower Bound	Upper Bound	Value	df1	df2
Single Measures	.435[a]	.034	.863	4.077	5	15
Average Measures	.755[c]	.123	.962	4.077	5	15

Intraclass Correlation Coefficient

	F Test with True Value 0[b]
	Sig
Single Measures	.015[a]
Average Measures	.015[c]

FIGURE 1. Reliability test results.

After the instrument is declared valid and reliable, the next stage is the analysis of the quality of *Nara Sela*'s fashion conducted by 5 fashion experts and 20 trained panelists. The assessment of an expert panelist of 3-5 people is sufficient to provide an objective assessment based on professional expertise (Kellerhuis et al., 2025). A combination of expert panelists and trained panelists is used to obtain a more objective assessment (Rahayu et al., 2025). Expert panelists assess product suitability based on professional competence, while trained panelists assess product quality based on user perceptions who already have a basic understanding of fashion. According to Sugiyono, the formula used to determine the percentage score is as follows.

$$\text{Percentage} = \frac{\sum \textbf{Score}}{\textbf{Ideal Score}} \text{x } 100\% \text{ (Women's 2023)}$$

Based on the percentage of the results of the fashion quality analysis, the quality of the fashion can be determined by converting the achievement level with a scale of 5.

TABLE 4. Quality criteria based on percentage.

Percentage	Category
81% - 100 %	Highly feasible
61% - 80%	Worthy
41% - 60%	Quite feasible
21% - 60%	Not eligible
0% -20%	Very unworthy

(Novitasari, 2025)

RESULTS AND DISCUSSION

Based on the formulation of the problem, the results of the research on the design and analysis of the quality of contemporary fashion *Nara Sela* with the integration of QR Code-based interactive technology are as follows.

Nara Sela Contemporary Fashion Design Process with QR Code-Based Interactive Technology Integration

Nara Sela Fashion was designed during the implementation of the fashion work course project. The theme of the 2025 fashion title is "*Meta Nusantara*: The Future of Wearable Heritage" which is then divided into 5 sub-themes, namely: Wastra, Transformation, Neo Eco, Goddes, and Techno-Batik. *Nara Sela* is part of the collection "*Teknika*: Technology and Aesthetics" with the sub-theme of Techno-Batik. The *Nara Sela* fashion design process uses the PPE (Planning-Production-Evaluation) development model.

Planning Stage

In the planning stage, the researcher conducted a literature study on contemporary fashion, the integration of technology in fashion, and QR Code as a source of ideas. The "*Teknika*: Technology and Aesthetics" collection is inspired by cables and electronic circuits that are symbols of the modern technological world that connects various physical and digital elements. These cable and circuit elements can be translated into batik designs into interconnected patterns or lines, creating a system that blends two seemingly different worlds, namely batik tradition and digital innovation.

The next stage is the creation of a moodboard according to the source of the idea. Moodboard functions as a visual medium to collect inspirational elements in the form of color palettes, fabric textures, shapes, silhouettes, illustration styles, and cultural references. The following is the moodboard of the collection "Technique: Technology and Aesthetics" from the Techno-Batik sub-theme.

FIGURE 2. *Nara Sela* moodboard.

After creating the concept and moodboard, the next stage is to create the design digitally using the Ibis Paint application. In the process of making this design, the researcher received a lot of input and suggestions from the internship supervisor, lecturers teaching the degree course, and guest lecturers. These inputs include: The collar is too high, and the position of the strap on the arm cuff should be moved. The following is a sketch of *Nara Sela* fashion design:

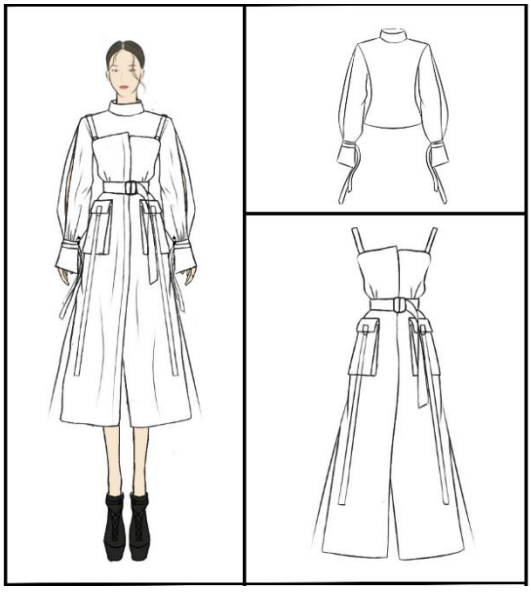

FIGURE 3. Technical drawing of *Nara Sela*.

Nara Sela clothing consists of blouses and overalls that lift the essence of space and grooves like small gaps in electronic circuits, through which the flow of information flows. A blouse design with split sleeves and a knee-length minimalist overall, this design reflects a visual simplicity that holds complex meaning. The details of the gaps (cleavages) become a symbol of the transition between the past and the future in which technology is inserted in the aesthetic, without erasing traditional values.

Nara Sela visually represents the transformation of traditional values into modern and interactive fashion design. The application of modified batik motifs in the form of cables and electronic circuits has succeeded in conveying the idea of connectivity, information flow, and cultural digitalization. This is in accordance with the Techno-Batik

approach raised in the sub-theme of the 2025 Fashion Work Title, where batik is not only preserved but also reconstructed through new forms. The following is *Nara Sela*'s fashion design with the integration of interactive technology in the form of QR Codes.

FIGURE 4. *Nara Sela* design.

The main innovation in *Nara Sela* fashion is the integration of QR Code-based interactive technology that is digitally created using QR generators on the web. The QR Code motif on *Nara Sela*'s clothing is made with elements in the form of boxes to match the source of *Teknika*'s idea, namely electronic circuits. The content in the QR Code is created in the form of a video using the Canva application containing a narrative of design concepts, fashion design, and documentation of the final product. The QR Code motif is then embroidered on the fabric to be made into clothing, and tested to ensure its readability and functionality. After it is clearly legible, the QR Code embroidery is pasted to the back of the clothes according to the design that has been made. The video content on *Nara Sela* clothing can be accessed only by scanning the QR Code on the clothes via smartphone, without any application. The following is the QR Code and the content of the content on the *Nara Sela* outfit.

FIGURE 5. QR Code of *Nara Sela*.

FIGURE 6. Fill in the QR code content.

Production Stage

The next stage is the production of *Nara Sela* clothing. At the production stage, there are several steps, including: 1) Making fashion patterns, 2) Designing materials, 3) Cutting materials, 4) Sewing clothes, 5) Inserting QR Codes on clothes, and 6) Finishing. Additional decorative elements, such as buckles or rings, are also installed to reinforce the visual concept and identity of the design according to the moodboard.

QR-Code is technically designed and tested to ensure it can be scanned properly using a smartphone. The scanning function is repeatedly tested to ensure the accuracy of the digital link and its display stability in a wide range of lighting. This QR-Code will direct users to interactive content created using the Canva application and contains information related to design philosophy, cultural messages that want to be conveyed through "*Nara Sela*" clothing, fashion design, and documentation of the final product of "*Nara Sela*" clothing.

With a combination of digital, traditional, and interactive technology, the "*Nara Sela*" fashion design process shows a thorough effort in presenting fashion that not only stands out aesthetically, but also has added value in the form of interactive technology. The following are the finished results of designing *Nara Sela* fashion with the integration of QR Code-based interactive technology.

(a) (b)

FIGURE 7. (a) The result of *Nara Sela* clothing on the front, (b) The result of *Nara Sela* clothing on the back.

Nara Sela Contemporary Fashion Quality Analysis with QR Code-Based Interactive Technology Integration

Evaluation Stage

The analysis of the quality of *Nara Sela* clothing was carried out at the evaluation stage. This stage is carried out to assess the final quality of *Nara Sela* clothing after the research instrument is declared valid and reliable. The fashion quality assessment involved 5 fashion experts, namely Widya Andhika Aji, S.Psi., S.I.Kom., Novita Dwi Parastuti, Sudarna Suwarsa, Ina Priyono, Purwosiwi Pandansari, S.Pd., M.Pd., and 20 trained panelists, with a total of 25 assessors, using instruments that include five fashion quality indicators, namely design, aesthetics, sewing and finishing techniques, fashion performance/overall appearance, and uniqueness.

Based on the results of data analysis of expert panelists and trained panelists as a whole, an average percentage of fashion quality was obtained of 96%, which is in the category of "Very Feasible". This shows that *Nara Sela* clothing as a whole has met fashion quality standards in accordance with the design objectives and assessment criteria set. The following is the percentage of the overall quality of *Nara Sela* clothing.

TABLE 5. Nara interlude quality table.

Product Quality Indicators	Percentage	Category
Design	96%	Highly Feasible
Aesthetics	95%	Highly Feasible
Sewing & Finishing Techniques	94%	Highly Feasible
Fashion Performance / Overall Appearance	96%	Highly Feasible
Uniqueness	97%	Highly Feasible

The design indicator obtained an average percentage of 96% (Very Feasible). Based on this assessment, the design concept, silhouette, proportion, and suitability of the design with the theme were judged very well by experts and trained panelists. These results show that *Nara Sela*'s fashion design has been able to translate the design concept into a visual form that is clear, proportional, and relevant to the theme carried. The following is the frequency of the percentage of *Nara Sela* fashion quality based on design indicators.

TABLE 6. Design indicator table.

Score	Category	Frequency
81% - 100%	Highly Feasible	25
61% - 80%	Feasible	0
41% - 60%	Quite Feasible	0
21% - 40%	Not Eligible	0
0% - 20%	Very Unworthy	0

The aesthetic indicator obtained an average percentage of 95% (Very Feasible). Aesthetic aspects include color harmony, material selection, and the overall visual effect of the dress. Although a small number of assessments are in the "Decent" category, this does not lower the overall assessment. In general, *Nara Sela* clothing is considered to have high aesthetic value and is able to display attractive visual characters The following is the frequency of the percentage of *Nara Sela* fashion quality based on aesthetic indicators.

TABLE 7. Aesthetic indicator table.

Score	Category	Frequency
81% - 100%	Highly Feasible	24
61% - 80%	Feasible	1
41% - 60%	Quite Feasible	0
21% - 40%	Not Eligible	0
0% - 20%	Very Unworthy	0

The results of the evaluation on the sewing and finishing technique indicators showed an average percentage of 94% (Very Feasible). This assessment reflects that the quality of the seams, neatness, construction strength, and finishing details have met good fashion standards. Some of the panellists gave a "Feasible" assessment, which indicates that there is a minor improvement, but overall *Nara Sela*'s fashion production technique is considered to be very feasible and professional. The following is the frequency of the percentage of *Nara Sela* fashion quality based on the Sewing & Finishing Technique indicator.

TABLE 8. Sewing & finishing technique indicator table.

Score	Category	Frequency
81% - 100%	Highly Feasible	22
61% - 80%	Feasible	3
41% - 60%	Quite Feasible	0
21% - 40%	Not Eligible	0
0% - 20%	Very Unworthy	0

The fashion performance indicator obtained an average percentage of 96% (Very Feasible). These aspects include comfort when worn, the fit of the clothing with the body, and the overall appearance when used. The high value on this indicator shows that *Nara Sela* clothing is not only visually superior, but also performs well when applied in real life. The following is the frequency of the percentage of *Nara Sela* fashion quality based on the overall fashion performance / appearance indicators.

TABLE 9. Fashion performance indicator table / overall appearance.

Score	Category	Frequency
81% - 100%	Highly Feasible	24
61% - 80%	Feasible	1
41% - 60%	Quite Feasible	0
21% - 40%	Not Eligible	0
0% - 20%	Very Unworthy	0

The uniqueness indicator obtained the highest average percentage of 97% (Very Feasible). Theoretically, uniqueness is an added value that distinguishes a fashion product from other products and reflects the design identity. The high value on the uniqueness indicator shows that *Nara Sela* fashion has a strong distinguishing character, both in terms of concept, design details, and creative approaches applied. This emphasizes that the clothing developed is not repetitive, but has prominent characteristics. The following is the frequency of the percentage of *Nara Sela* fashion quality based on uniqueness indicators.

TABLE 10. Table of uniqueness indicators.

Score	Category	Frequency
81% - 100%	Highly Feasible	24
61% - 80%	Feasible	1
41% - 60%	Quite Feasible	0
21% - 40%	Not Eligible	0
0% - 20%	Very Unworthy	0

From the perception of fashion experts, quality assessments tend to be done more critically and technically. Experts assessed *Nara Sela* fashion by considering the suitability of the design to the concept, the accuracy of pattern construction, the quality of sewing and finishing techniques, and the consistency of applying fashion design principles. Despite this, an average score of 92% indicates that according to the professional view, *Nara Sela* fashion has met good and decent quality standards, with the possibility of minor improvements in certain technical aspects. The following is the percentage of *Nara Sela* fashion quality based on the assessment of fashion experts.

TABLE 11. Nara interlude quality table from the fashion expert assessment.

Product Quality Indicators	Percentage	Category	Average
Design	90%	Highly Feasible	
Aesthetics	94%	Highly Feasible	
Sewing & Finishing Techniques	92%	Highly Feasible	92%
Fashion Performance / Overall Appearance	91%	Highly Feasible	
Uniqueness	94%	Highly Feasible	

Meanwhile, the trained panelists gave a higher inclination assessment, which was an average of 96%. This shows that from the point of view of trained users, *Nara Sela* clothing is considered very good in terms of visuals, comfort, and overall appearance when worn. Trained panelists tend to judge based on direct experience in using or observing clothing, so that the perception of aesthetics, performance, and uniqueness of fashion is the dominant aspect in the assessment.

TABLE 12. Table of quality of interlocutors from the assessment of trained panellists.

Product Quality Indicators	Percentage	Category	Average
Design	97%	Highly Feasible	
Aesthetics	95%	Highly Feasible	
Sewing & Finishing Techniques	95%	Highly Feasible	96%
Fashion Performance / Overall Appearance	97%	Highly Feasible	
Uniqueness	98%	Highly Feasible	

The results of the analysis showed that the average percentage of the assessment of fashion experts was 92% and the average assessment of trained panelists was 96%, both in the category of "Very Feasible". The difference in scores shows that trained panelists tend to give higher ratings, but in general there is a general alignment in quality perceptions between expert assessors and trained panelists. The consistency of this assessment strengthens the finding that the quality of *Nara Sela*'s fashion has met the expected quality standards from both a professional and a trained user perspective.

Discussion

Nara Sela Contemporary Fashion Design Process with QR Code-Based Interactive Technology Integration

This research was carried out through 3 stages, namely the planning, production, and evaluation stages. This approach was chosen because the research focuses on the process of designing contemporary fashion with the integration of interactive technology in the form of QR Codes. In addition to producing works, this study also analyzes the quality of fashion to determine the level of feasibility and product quality based on aspects of design, aesthetics, sewing and finishing techniques, fashion performance, and uniqueness.

In the planning stage, the researcher conducted a literature study on contemporary fashion, the integration of technology in clothing, and QR Codes. This literature study became the main foundation in the creation of *Nara Sela* clothing. After conducting a literature study, an analysis and determination of fashion concepts were carried out in accordance with themes and sub-themes. The source of an idea is anything that can cause a stimulus for the birth of a creation (Purnami et al., 2023).

The "*Teknika*: Technology and Aesthetics" collection is inspired by cables and electronic circuits that are symbols of the modern technological world that connects various physical and digital elements. In batik design, these wires and circuits can be translated into interconnected patterns or lines, creating a system that blends two seemingly different worlds, namely batik tradition and digital innovation. This fashion uses the concept of contemporary batik, where contemporary batik has motifs and styles that are not bound by certain rules (Fardhani & Katresna, 2024). In addition, QR Code integration also bridges the gap between physical products and the digital world (Mustafa et al., 2025). The concept was then developed into a mood board to be used as a guideline in making fashion designs.

A moodboard is an inspiration board that contains a collection of images, colors, or types of objects that can illustrate a designer's ideas (Nasution, 2024). At this stage, the researcher makes a design design media consisting of an arrangement of several images related to colors, textures, shapes, and object samples from the source of the idea (Jannah et al., 2025). Moodboard functions as a visual medium to collect inspirational elements in the form of color palettes, fabric textures, shapes, silhouettes, illustration styles, and cultural references. After making the moodboard, proceed to make a sketch design according to the moodboard that has been made previously. (Vera et al., 2021).

The next stage is production which concerns the process of making products based on the design that has been made (Christina & Asiatun, 2025). The production stage is carried out by making patterns, designing materials, cutting materials, sewing clothes, and finishing (Purnami et al., 2023). The pattern is made according to the size of the model, then from the pattern a material design is made to estimate the needs of the fabric. After that, the material is cut and the sewing process is carried out.

The integration of QR Codes in *Nara Sela* clothing is carried out using embroidery techniques. The *Nara Sela* fashion content link is made a QR Code, and then embroidered on the back of the *Nara Sela* clothing overalls. Embroidery is one of the decorative techniques in the form of embroidery made on fabric using a machine (Fatminingrum & Yulistiana, 2022). The last is the finishing process, at this stage additional decorative elements such as buckles or rings are also installed to strengthen the visual concept and design identity according to the moodboard.

Nara Sela Contemporary Fashion Quality Analysis with QR Code-Based Interactive Technology Integration

The analysis of the quality of *Nara Sela*'s clothing was carried out at the evaluation stage with 5 assessment indicators, namely 1) Design; 2) Aesthetics; 3) Sewing and solution techniques; 4) Performance or overall appearance; 5) Uniqueness (innovation and creativity). Product quality is the ability of the product to perform its function (Wardhani, 2024). Product evaluation was carried out by 5 fashion experts and 20 trained panelists. Then, the assessment results data are analyzed with a descriptive qualitative approach. The author processed the scores of each aspect of the assessment to obtain the overall percentage of fashion quality. The results of the analysis were used to conclude the quality of the fashion.

The results of the study show that *Nara Sela*'s contemporary fashion with the integration of QR Code-based interactive technology has good product quality with the results of data analysis of expert panelists and trained panelists as a whole, an average percentage of fashion quality of 96%, which is in the "Very Feasible" category. The results of the analysis of *Nara Sela* fashion quality per indicator are as follows: 1) The design indicator obtained an average percentage of 96% (Very Feasible), 2) The aesthetic indicator obtained an average percentage of 95% (Very Feasible), 3) The sewing and finishing technique indicator showed an average percentage of 94% (Very Feasible), 4)

The fashion performance indicator obtained an average percentage of 96% (Very Feasible), 5) The uniqueness indicator obtained the highest average percentage 97% (Very Feasible). This shows that *Nara Sela* clothing as a whole has met fashion quality standards in accordance with the design objectives and assessment criteria set. This research is only limited to product assessment.

When compared to previous research, the results of this study show a development in the application of QR Codes in clothing. In the research conducted by Vorobchuk, it only explained the potential use of QR Code as a decorative element of fashion design as well as an interactive medium. Meanwhile, in the research conducted by Ayunda, QR Code only acts as an interactive medium, but it is not part of the fashion design itself. Research on contemporary fashion *Nara Sela* with the integration of QR Code-based interactive technology proves that the application of QR Code technology in fashion can be part of fashion design, as well as providing added value to fashion with a user experience. This shows that the use of digital technology can be an innovative strategy in contemporary fashion development in the modern era.

The high value in the uniqueness indicator (97%) was obtained due to the existence of QR Codes that function not only as a digital information medium, but also as a visual part of fashion design. The QR Code on *Nara Sela* clothing connects fashion with digital content in the form of design concept narratives and documentation in the form of fashion photos and videos, thus creating an interactive experience for users. This reinforces the character of fashion as a contemporary work that combines aesthetic values, technological innovation, and user experience. This uniqueness is the main distinguishing factor of *Nara Sela* clothing compared to conventional contemporary clothing in general.

CONCLUSION

This study shows that *Nara Sela*'s contemporary fashion design with the integration of QR Code-based interactive technology through the PPE (Planning, Production, Evaluation) model produces quality and feasible fashion works in terms of design and product. The results of the study showed: 1) The process of designing contemporary *Nara Sela* fashion with the integration of QR Code-based interactive technology containing digital content in the form of design concept narratives, fashion design, and documentation of *Nara Sela* fashion photos and videos proves that the application of QR Code technology in fashion can provide added value to fashion with a user experience. This shows that the use of digital technology can be an innovative strategy in contemporary fashion development in the modern era. 2) The results of the evaluation show that the quality of *Nara Sela*'s fashion is considered very feasible by expert panelists and trained panelists in several aspects, namely design, aesthetics, sewing techniques and finishes, performance or overall appearance, and uniqueness, so as to reflect the harmony between professional standards and the perception of trained users. These findings show that QR Codes not only serve as an information medium, but can also be an integral part of fashion design without compromising on aesthetic and product quality. This research contributes to filling the research gap related to the analysis of the design process and quality of contemporary fashion based on QR Code interactive technology and strengthens the PPE model as an effective approach in the development of adaptive fashion to technological developments.

Based on the results of the study, further research is recommended to examine aspects of user experience in more depth, such as ease of use, user engagement level, and perception of interactivity resulting from the use of QR Codes in clothing. In addition, further research can develop a more interactive variety of digital content, such as animation or augmented reality, as well as apply QR Code integration to different types of clothing or user segments to obtain a broader picture of the effectiveness of interactive technology in the development of contemporary fashion.

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