# ИНОВАЦИИ И ПРЕДПРИЕМАЧЕСТВО

НАУЧНО-ПРИЛОЖНО СПИСАНИЕ
■ ГОДИНА V ■ БРОЙ 3, 2017

# INNOVATION AND ENTREPRENEURSHIP

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ИНСТИТУТ ЗА ИНОВАЦИИ
И ПРЕДПРИЕМАЧЕСТВО

СОФИЯ - SOFIA
2017

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**ИНОВАЦИИ И ПРЕДПРИЕМАЧЕСТВО**
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## *ТЕХНИЧЕСКИ НАУКИ / TECHNICAL SCIENCES*

# DECISION SUPPORT SYSTEM FOR HIGHER EDUCATION (RESEARCH` EXAMINERS & REVIEWERS) IN EGYPTIAN

**Elsayed A. Elnashar, , Ahmed HEGGI**

***Abstract***: In design decision support system for postgraduate and research` examiners and reviewers of educational studies sector in supreme council of Egyptian universities for 27 facilities plus the institutes that belong of education sector studies to explanation of evaluating a methodology; the methodology is the backbone of most scientific examiners and reviewers experiments. An aim of our research is to develop a computer system to innovation decision support system for Postgraduate and research` Examiners and Reviewers of Educational Studies Sector in Supreme Council of Egyptian universities. while it is difficult to overestimate the importance of various computer-based tools that are relevant to decision making (e.g., databases, planning software, and spreadsheets), this article focuses primarily on the core of a decision support system for postgraduate and research` examiners, the part that directly supports modeling decision problems and identifies best alternatives. For this objective, this paper describes design strategies, online systems to provide solutions to improve postgraduate and research` efficiency using technology to the fullest. costume examiners` of postgraduate and research` movement and the response of masses with reference to decision support system, technical analysis, used in timing the reviewers in this paper, the ontological Education approach to analyzing designers' innovation-idea explanation style. In ontological Education, it is said that to define knowledge as ontology is effective in defining its essential qualities. The effectiveness of the ontological Education approach on our research topic, and concluded that our ontological framework of software designers'

***Keywords***: Decision Support System, Postgraduate and research, Examiners, Educational, Supreme Council

## 1. Introduction

Technology for the renaissance strategy and sustainable development [1] of Egyptian faculties of education throw the Postgraduate and research` department, program and faculty assessment are important steps in analyzing and discovering strengths and weaknesses of Postgraduate and research` and programs, planning and enhancing instruction and curriculum as well as evaluating and making decisions about Postgraduate and research` students. Evaluation is defined as the act of assigning merit or worth to something about postgraduate and research` examiners and reviewers of educational studies sector. There is a need to do both in academic environments [5]. Furthermore, it is necessary to repeat this process periodically, at the end of each semester and academic year as well as over a specified period of time in order to get a better idea. Indeed, some academic decisions do not lend themselves to comprehensive assessment postgraduate and research within a very short time. There are different but

related forms of evaluation postgraduate and research` in academia including assessment, outcomes measurement, and retention and attrition measurements. Assessment is defined as determining the value [3], significance or extent of something. Outcomes Postgraduate and research is expected to concentrate more on academic and intellectual growth of Postgraduate and research. Assessment techniques of examiners of educational studies sector have been discussed widely in the literature. Both qualitative and quantitative assessment techniques are available [11]. Alternative forms of assessment including curriculum-based [2,9], portfolios, outcomes-based [10] performance- based assessment, and other means of testing postgraduate and research` students have also been developed of examiners of educational studies sector. A number of universities have set up measurement and evaluation units under instructional development offices and carry out senior Postgraduate and research` surveys as part of Postgraduate and research outcome assessment. These units are developing assessment models and are planning the use of results of these efforts to improve instruction and learning[7,9]. The use of qualitative techniques based on Postgraduate and researches data available in university necessitate the use of data warehousing and mining techniques since these databases may be rather large and may be distributed. In addition, decision-support systems [6, 12] have a place in presenting the data in a meaningful and useful way to the evaluators Postgraduate and research student and administrators.

In order to gain an insight, assess Postgraduate and research and evaluate academic performance, there is a need to carry out statistical analyses at student, course, program, department, school and university levels. However, the data needs to be presented in an understandable form to start with. Detailed statistical testing and inferences can then be made [8]. In this work we have aimed at providing a decision-support platform for Postgraduate and research' students and academic administrators such that data is made available through the use of standard user interfaces, displays and graphs, as well as in tabular form. This is expected to minimize the time and effort needed to analyze pages of data since they are presented in similar forms for similar objectives. Academic decisions may require extensive analysis of Postgraduate and research student achievement levels. Statistical data can also be used to see the results of important academic decisions. It is necessary to have measurements to make appropriate academic decisions on one hand[9], while on the other hand, there The present postgraduate and research` regulation builds on the experience gained during the past four years, and includes only minor revisions to the semesters specifications, issued for the first time in 2000. The adoption of the credit-hour system aimed at being compatible with advanced scientific institutions, thus facilitating credit transfer between different universities [4,5]. In this regulation, several curricula were updated by adding new courses and/or revising existing ones.

### 1.1. THESES AND DISSERTATIONS PROCESSING

After the student completes the Thesis and gets it signed by the Main Advisor, he/she submits two copies of the Thesis to the Responsible Department and a date for a general lecture on the subject of the Thesis (Seminar) is set. After the Seminar [4, 5], the Thesis Main Advisor presents the following to the Department Council, in preparation to submission to the Faculty Council:

a - A report indicating that the Thesis is ready for evaluation, indicating the Thesis title in both Arabic and English.

b - A request for the Thesis Evaluation Committee, including the names of five candidates, one of them the Thesis Advisor (or Advisors, counted as one vote).

c - Four copies of the Thesis written in accordance with the rules and formatting for writing theses are submitted to the Thesis Evaluation Committee.

After the necessary modifications are done and the Thesis is accepted by the Thesis Evaluation Committee, the student submits to the Graduate Studies Administration the following: five copies of the Thesis approved by the Thesis Advisors as well as the Thesis Evaluation Committee and the Department Chair; a CD containing a soft copy of the Thesis and forms; and five hard copies of the

Summary in Arabic and English, approved by the Thesis Main Advisor; in addition to a data sheet signed by the student and advisors.

### 1.2. THESIS EVALUATION COMMITTEE

Examiners and reviewers of educational studies sector for diploma and Scientific Theses and Dissertations:

1 - Upon the recommendation of the Department Council, the Faculty Council forms an Evaluation Committee for the Thesis/Dissertation consisting of three faculty members; one of them is the Advisor(s) with one vote, and two other examiners who are Professors or Associate Professors in Egyptian or foreign universities or experts in similar scientific experience provided that at least one of them is not a member of the staff of the Faculty of Education, in that University. The Evaluation Committee is chaired by the most senior member. If a new member is added to the Thesis supervision, the Evaluation Committee shall not be formed unless six months have elapsed since the date of addition of the new advisor, provided that the student has not exceeded the maximum period allowed for the Thesis preparation. The University Vice President for Graduate Studies and Research approves the Evaluation Committee after the approval of the Faculty Council. A Thesis shall not be defended or reviewed before at least two weeks has passed from the date the Committee was officially approved by the university. Approval of the Evaluation Committee is an implicit approval of a 6-month extension for the Thesis. This six month duration is the period of validity of the Evaluation Committee [4,5].

2 - Members of the Evaluation Committee appointed by the Department Council must have sufficient experience in the specific area of research and have scientific publications in the same area.

3 - In the Evaluation Committee for a Master Thesis, at least one of the examiners shall not be a member of the Faculty of Education, that University staff.

4 - In the Evaluation Committee for a Ph. D. Dissertation, at least one of the examiners shall not be a member of the that University staff.

5 - A faculty member shall not participate in an Evaluation Committee for a student who is related to him/her up to the fourth level.

6 - Upon the request of the Thesis Main Advisor, the Responsible Department Chair and Vice Dean for Graduate Studies and Research approve the date of the defense.

7 - The defense may take place in the presence of two members of the Evaluation Committee provided that the Thesis Advisor is one of them. In case one of the Committee members is not a resident of Egypt, it is sufficient to receive a report from him/her stating his/her assessment of the Thesis.

8 - Each member of the Evaluation Committee shall submit a Thesis report, in addition to a group report using the standard forms prepared by the Graduate Studies for Thesis evaluation. The Thesis defense conclusion and all reports are presented to the Responsible Department Council, then to the Graduate Studies Committee, then to the Faculty Council prior to submission to the University Council.

The Thesis may be completed by the student according to what the committee deems necessary and he/she is granted an extension of not more than six months after the date of the defense provided that the student has not exceeded the maximum period allowed for the Thesis. In such a case, the student is reexamined and a new group report is submitted to the Responsible Department Council with the outcome of the Thesis review and discussions.

### 1.3. POSTGRADUATE AND DIPLOMA

The University Council grants the degree of Postgraduate and research Diploma in one of the specializations upon the recommendations of the Faculty of Education Council. The Certificate is granted indicating the title of the Diploma.

### 1.4 MASTER OF SCIENCE IN EDUCATION

The University Council grants, upon the recommendation of the Faculty Council, the degree of M. Sc. via the scientific departments. The name of the scientific department (and specialization) and the title of the Thesis shall be stated in the certificate. Other interdisciplinary specializations among different Education departments or in collaboration with foreign distinguished universities may be introduced upon proposal by the Faculty Council and approval of the University Council.

**1.5. SUPERVISION [4, 5]**

The Faculty Council appoints the Thesis Main Advisor, upon the suggestion of the Responsible Department Council and approval of the Graduate Studies Committee. The Main Advisor shall be chosen from the Professors or Associate Professors of the Faculty. Assistant Professors may also be included in the Supervision Committee. The Supervision Committee may include specialists who are at the same level as Professors or Associate Professors, upon the approval of the Faculty Council. The number of advisors shall not be more than three. The Advisor is appointed while the student is studying the courses and before working on the Thesis, If one of the Thesis Advisors has to travel for a long duration, the Faculty Council may opt to leave the supervision committee unchanged, or to add a new member, or remove the name of the Member who is travelling abroad or both actions. This is done upon the recommendations of the Responsible Department Council and the approval of the Graduate Studies Committee, based on a report presented by the travelling member prior to his travel and endorsed by the Main Advisor, provided that item "a" is implemented. The Thesis Main Advisor may suggest a modification of the advisory committee by adding or removing members or both. The suggestion shall be approved by the Responsible Department Council, the Graduate Studies Committee, the Faculty Council, and the University Vice President for Graduate Studies and Research, provided that item "a" is implemented. The Thesis Main Advisor shall present a report at the end of the Academic Year to the Responsible Department Council describing the progress of the student and recommending continuation or termination of his/her enrollment.

**1.6. AWARDING THE DEGREE**

The Faculty Council shall recommend awarding of the Master degree upon the recommendation of the Responsible Department Council and the Graduate Studies Committee when the student fulfills the following requirements:

a. Completion of at least four main semesters from the date of registration.

b. Succeeding in all course requirements

c. Acceptance of the Thesis by the Evaluation Committee and their recommendation.

**1.7. DOCTOR OF PHILOSOPHY IN EDUCATION**

Areas of Study That University grants, upon the recommendation of the Faculty of Education Council, the degree of Ph. D. via study in the scientific departments. The name of the scientific department (and specialization) and the title of the Dissertation shall be stated in the certificate.

**1.8. COMPLETING THE COMPREHENSIVE EXAM. [4,5]**

The supervision of the Dissertation may be joined between a committee determined

by That University and an Advisor from another foreign university or Institution approved by the Supreme Council of Universities in Egypt. In this case, the number of advisors shall not be more than four.

Through reviewing the above our challenges faced the faculties of education in Egypt needs a renaissance of comprehensive development [9], which begins with selecting the reviewers and analysts for the needs of the labor market and designing them in the form of curricula and study programs, including the selection of the best examiners, for the bachelor's, diploma, master's and doctoral degrees depends on the election of examiners for each stage of the above. And the aim of our research is to develop a computer system to innovation decision support system for Postgraduate and research Examiners and Reviewers of Educational Studies Sector in Supreme Council of Egyptian universities. while it is difficult to overestimate the importance of various computer-based tools that are relevant to decision making (e.g., databases, planning software, and spreadsheets), this article focuses primarily on the core of a decision support system for postgraduate and research` examiners, the part that directly supports modeling decision problems and identifies best alternatives. For this objective, this paper describes design strategies, online systems to provide solutions to improve postgraduate and research` efficiency using technology to the fullest. costume examiners` of postgraduate and research` movement and the response of masses with reference to decision support system, technical analysis, used in timing the reviewers in this paper, the ontological Education approach to analyzing designers' innovation-idea explanation style[9]. In ontological Education, it is said that to define knowledge as ontology is effective in defining its essential qualities. The effectiveness of the ontological Education approach on our research topic, and concluded that our ontological framework of software designers'

### 1.9. RATIONALE AND OBJECTIVES

The system aim is to present academic decision makers with facilities of Education in Egypt for the evaluation of academic performance as well as presenting them with a tool for organized information access. It is also aimed to shed new light on potentially new techniques that can be used in the evaluation of major elements of academic decisions. The above may be achieved with the following objectives:

- Analysis and design of a new academic performance evaluation criteria.

- An in-depth understanding and demonstration of the parameters affecting academic performance In Egyptian universities.

- Analysis, design and development of a software system suitable for facilities of Education using the semester based education system. This system would be a complete package

Unlike most current systems, which necessitate manual data extraction and evaluation by users.

- Development of intelligent, object-based or object-oriented user interfaces for easy

navigation.

And obtainment of required information from the databases.

- Development of a general database application programmer's interface for future adaptation to

Other Egyptian universities.

- Design and development of a modular object based/ oriented software package providing

Solutions to the ideas proposed above [8].

- Demonstration of powerful techniques for achieving the aims of development the facilities of Education the project in Egypt.

## 2. EXCREMENTAL WORK

Systems analysis is a necessary part of development of every engineered software. This is found to be useful for this particular development due to the complex nature of data to be presented. The particular methodology used for system development is the Structured Systems Analysis and Design Methodology (SSADM). By using the SSADM, data and control flow in a system can be determined and shown in the systems analysis phase. The PADSS system interacts with users and the various databases to produce, display, print or save the results obtained. The Data Flow Diagram (DFD) of Fig. 2 shows the main interaction types at near-conceptual level. The system design is modular and allows the addition of necessary modules at a later stage to the software package. The system is GUI based and hence necessitates little input from the users, achieving results with mere mouse clicks. Object based techniques have been used in developing the software. A purpose-designed application database is designed and implemented. The data available in the university databases are converted, calculated and sorted to form the core of the package database. This is done in order to have a maintainable standard database interface, to de-couple the development from local university databases and to provide a Database User Interface (DUI) or `Database API' to which all other available database formats, from any university can be converted. Furthermore, with this technique ease and speed of access are the aims to be achieved. The superiority of even simple linear decision models over human intuitive judgment suggests that one way to improve the quality of s decision support system for postgraduate and research' examiners and reviewers of educational studies sector (DSSPREESS) is to decompose (DSSPREESS) problem into simpler components that are well defined and well understood. Studying a complex system built out of such components can be subsequently aided by a formal, theoretically sound technique. The process of decomposing and formalizing a problem is often called modeling. Modeling amounts to finding an abstract representation of a real-world system that simplifies and assumes as much as possible about the system, and while retaining the system's essential relationships, omits unnecessary detail, include the Education structure and the creative design witch including three levels the internal level,

external level, the conceptual level so, transfer that to relation form of tables window for produce reports form the external level. Building a model of decision support systems, by using Microsoft Visual Basic 6.0 for 32-bit windows Development, allows for applying scientific knowledge that can be transferred across problems and often across domains. It allows for analyzing, explaining, and arguing about a decision support system for postgraduate and research` examiners and reviewers of educational studies sector (DSSPREESS), in Fig.1: Proceeding of implementations of decision support system for postgraduate and research` examiners and reviewers (DSSPREESS), Data available in the university academic databases are not used directly, as these are not optimized for the purpose of this project. Two types of files are used to form the PADDS database. The necessary data from the database of the university are converted into text and MDB (Microsoft Database Format) files after applying the necessary calculations. As can be seen no new data type is produced. In many applications a new data file type is produced specially for the application. This feature has one big advantage; any other database or statistics program can use the PADDS database. There is no need to have any special application to convert, to see and to use the produced database. The reason for using the text and MDB file types is based on a simple logic. Text files are easily manageable and the MDB file type is native to many well-known programming languages; hence, there is no need to use any extra interface program to maintain compatibility.

## 3. RESULTS AND DISCUSSIONS

Decision support system for postgraduate and research` examiners to recognition that all postgraduate and research` students deserve an excellent academic experience of learning, teaching and assessment, the protection and continuation of Egypt-wide external peer review by an educational studies sector in supreme council of government and funding decisions , the effective identification of excellence in learning, teaching and assessment, through integrated quality assurance and Teaching Excellence Framework, the extension of postgraduate and research` students engagement in quality assurance and the enhancement of learning and teaching, maintaining and enhancing the world-leading reputation of Egyptian higher education, underpinned by international respect for its excellent quality assurance, a single register and ‘gateway’ for all higher education providers, a contextualized approach to external review, taking into account an institution’s track record and capacity to manage its own standards and quality, and a greater focus on enhancement, provision of assurance to postgraduate and research` students, employers, the public and governments, cost-effective approaches to quality assurance, rapid and proportionate investigation of concerns when they arise, the identification of emerging issues and trends, with action taken to promote or halt them as necessary. Components of decision support systems models while mathematically a model consists of variables and a specification of interactions among them, from the point of view of decision support system for postgraduate and research` examiners and

reviewers of educational studies sector (DSSPREESS) making a model and its variables represent the following three components: a measure of preferences over decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS)objectives, available (DSSPREESS) options, and a measure of uncertainty over variables incensing the(DSSPREESS),and the outcomes. Preference is widely viewed as the most important concept in for postgraduate and research` examiners and reviewers (DSSPREESS) making. Outcomes of decision support systems, process are not all equally attractive and it is crucial for decision support systems, maker to examine these outcomes in terms of their desirability. Preferences can be ordinal (e.g., more income is preferred to less income), but it is convenient and often necessary to represent them as numerical quantities, especially if the outcome of the decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) process consists of multiple attributes that need to be compared on a common scale. Even when they consist of just a single attribute but the choice is made under uncertainty, expressing preferences numerically allows for trade-of between desirability and risk. The second component of decision support systems, problems is available decision support systems, options. Listing the available decision support systems, options is an important element of model structuring. Fig.2: components models of decision support system for postgraduate and research` examiners and reviewers (DSSPREESS).

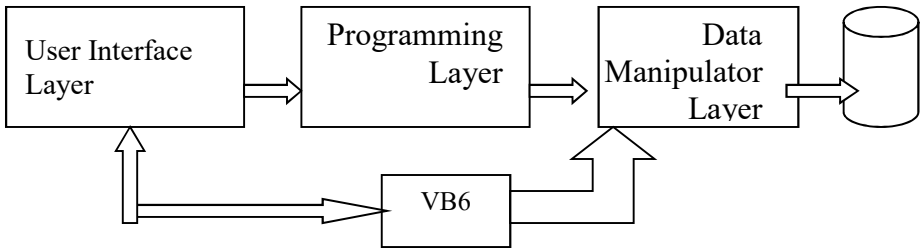


**Fig.1. Proceeding of implementations of decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS)**

Throw the elements of postgraduate and research` environment in figure 2, between Faculty of Education Department, Support Facilities, Support Faculties, Research Plan, Scientific Publishing, and Universities cooperation. We find the main engine of all these elements in the postgraduate studies and research progress to benefit the local community and the international is the examiner, reviewer and analyst.

Our component work Throw the department in faculties of Education: Curriculum and teaching methods, Pedagogy Psychological health, Comparative Education, Kindergarten, Languages (English), and Languages (French). And cooperation with other faculties such as; Specific education (Technology- Economic–Art Education), Faculty of Science (Mathematical-Chemistry-Physics-), Faculty of Arts "Literature" (English-French-

...) And Fields (agricultural, commercial, industrial).

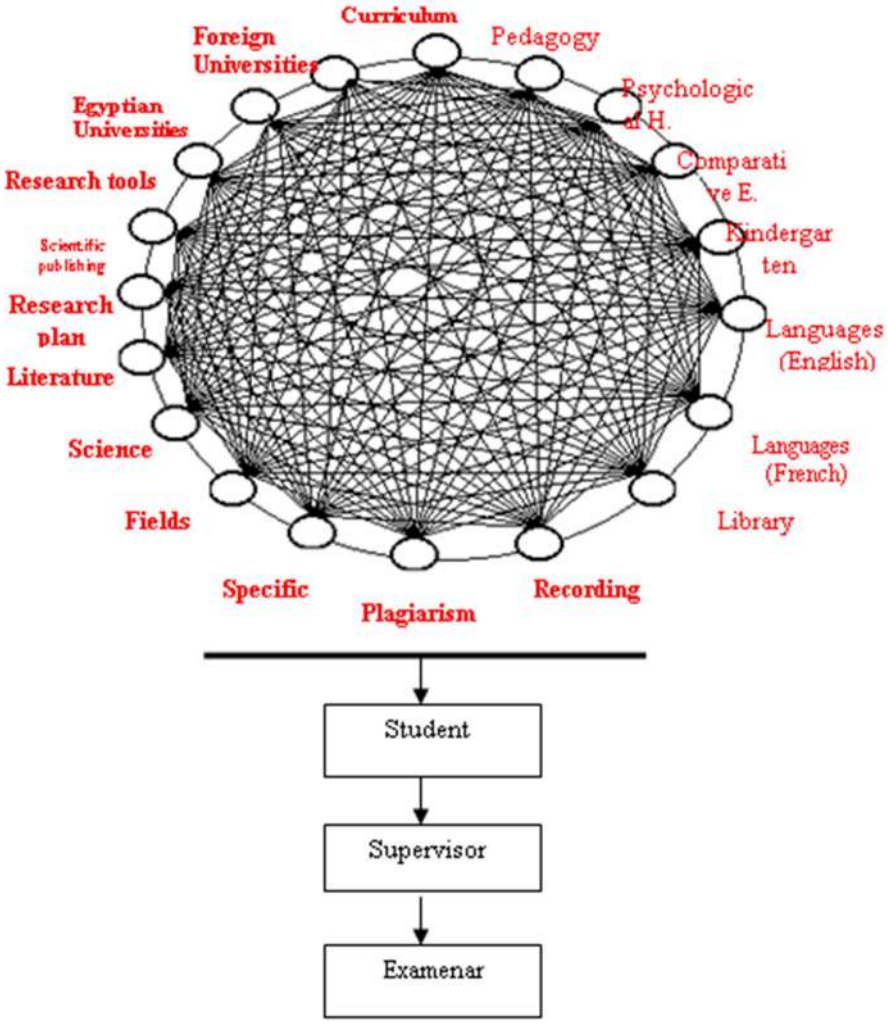


**Fig.2. Components models of decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS)**

Cooperation with Egyptian Universities and Foreign Universities, So the postgraduate and research` needs: Library, Recording, software of Plagiarism, Research plan funded and approved, Scientific publishing and scientific journals, Research tools of Center for production of technology. And one or three Database for the following: Student (Database for students: general and exact specialization and title of Master, Doctorate) and controls rule, Supervisor (Database: general specialization, accurate and thesis supervisor) and controls, and Examiners (Database: general and exact specialization, number of theses discussed) and controls The third element of decision support system for postgraduate and research` examiners and reviewers of educational studies sector (DSSPREESS), models is uncertainty. Uncertainty is one of the most inherent and most prevalent properties of knowledge, originating from incompleteness of information, imprecision, and model approximations made for the sake of simplicity. It would not be an exaggeration to state that real-world decision support system for postgraduate and

research` examiners and reviewers (DSSPREESS) not involving uncertainty either do not exist or belong to a truly limited class. Fig.3: the relational of decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS).

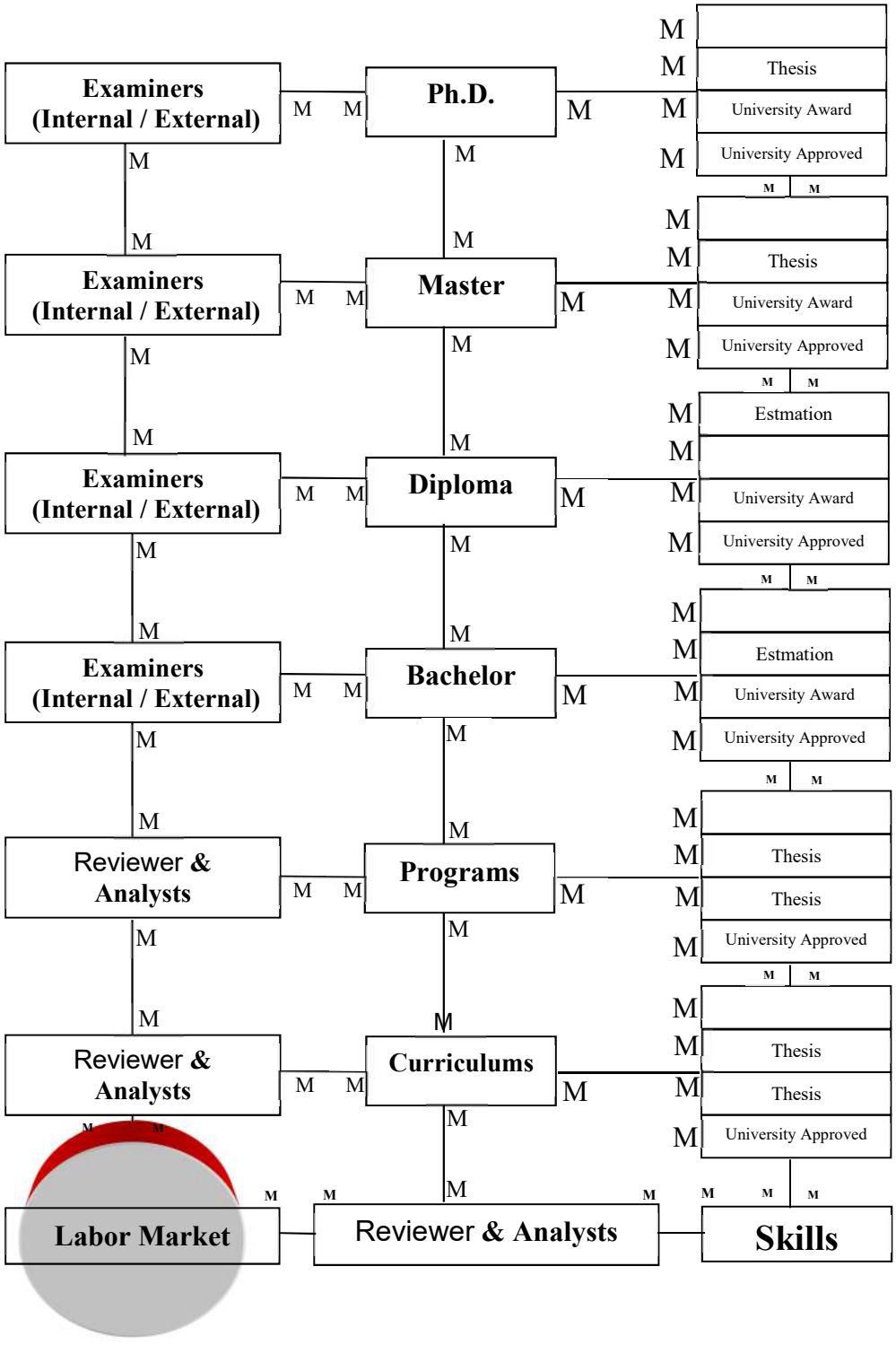


**Fig.3. The relational Of Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector (DSSPREESS)**

Decision support systems making under uncertainty can be viewed as a deliberation: determining what action should be taken that will maximize the expected

gain. Due to uncertainty there is no guarantee that the result of the action will be the one intended, and the best one can hope for is to maximize the chance of a desirable outcome. The process rests on the assumption that good decision support systems, is one that results from a good decision support systems making process that considers all important factors and is explicit about decision support systems alternatives, preferences, and uncertainty. It is important to distinguish between good decisions and good outcomes. By a stroke of good luck a poor decision support systems can lead to a very good outcome. Similarly, very good decision support systems, can be followed by a bad outcome. Supporting decision support systems means supporting the decision support systems making process so that better decision support systems, are made. Better decision support systems can be expected to lead to better outcomes. Based software package has been designed and developed called the Performance-based Academic Decision Support System, which provides a flexible and sophisticated environment for presenting the ideas proposed as well as having the flexible infrastructure for future expansion. this package facilitates the analysis by providing a user-friendly environment, useful graphical charts, easily readable tables, opportunity of different point of views to the analysis, and sharing of information. the package is designed with many useful features like the `toolbox' feature, which allows the developers to add future packages easily and elements of post graduate search engine' which helps the user to find personal and academic information about any examiners recorded in the studies sector in supreme council database. Finally, update ability of the data used by the package has been developed, allowing use of new data added to the studies sector in supreme council database during each new academic semester.

Decision support system for postgraduate and research' examiners and reviewers (DSSPREESS) are interactive, computer-based systems that aid users in judgment and choice activities. They provide data storage and retrieval but enhance the traditional information access and retrieval functions with support for model building and model-based reasoning. They support framing, modeling, and problem solving. Typical application areas of (DSSPREESS) are management and planning in business, health care, the military, and any area in which management will encounter complex decision support systems situations. Decision support systems are typically used for strategic and tactical decision support systems, faced by upper-level management decision support systems with a reasonably low frequency and high potential consequences in which the time taken for thinking through and modeling the problem pays of generously in the long run. There are three fundamental components of(DSSPREESS) Database management system (DBMS). A DBMS serves as a data bank for the (DSSPREESS) It stores large quantities of data that are relevant to the class of problems for which the (DSSPREESS) has been designed and provides logical data structures (as opposed to the physical data structures) with which the users interact. A DBMS separates the users from the physical aspects of the database structure and processing. It should also be capable of informing

the user of the types of data that are available and how to gain access to them.

- Model-base management system (MBMS). The role of MBMS is analogous to that of a DBMS.

Its primary function is providing independence between specific models that are used in a (DSSPREESS) from the applications that use them. The purpose of an MBMS is to transform data from the DBMS into information that is useful in decision support systems, making. Since many problems that the user of (DSSPREESS) will cope with may be unstructured, the MBMS should also be capable of assisting the user in model building.

- Dialog generation and management system (DGMS). The main product of an interaction with (DSSPREESS) is insight. As their users are often managers who are not computer-trained, (DSSPREESS), need to be equipped with intuitive and easy-to-use interfaces.

### 3.1. ANALYTIC (DSSPREESS)

An emergent class of(DSSPREESS)known as decision support systems analytic(DSSPREESS), applies the principles of decision support systems theory, probability theory, and decision support systems analysis to their decision support systems models. Decision support systems, theory is an axiomatic theory of decision support systems, making that is built on a small set of axioms of rational decision support systems making. It expresses uncertainty in terms of probabilities and preferences in terms of utilities. These are combined using the operation of mathematical expectation. The attractiveness of probability theory, as a formalism for handling uncertainty in (DSSPREESS) lies in its soundness and its guarantees concerning long-term performance. Probability theory is often viewed as the gold standard for rationality in reasoning under uncertainty. Following its axioms offers protection from some elementary inconsistencies. Their violation, on the other hand, can be demonstrated to lead to sure losses. Decision support systems analysis is the art and science of applying decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) theory to real-world problems. It includes a wealth of techniques for model construction such as methods for elicitation of model structure and probability distributions that allow minimization of human bias, methods for checking the sensitivity of a model to imprecision in the data, computing the value of obtaining additional information, and presentation of results.

### 3.2. CONCEPTUAL LEVEL

Conceptual Level of Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector by writing all entities in rectangle, and attribute in ovals, for example in Fig.4: Entity of Examiners (Internal/ External) Ph.D. Construction, so we designed following: The need for the labor market Curriculum Programs Bachelor

Diploma, Master and Ph.D. Reviewer &analysts Examiners(Internal/External)Thesis, Degree Prof/Associated) Local/International Date of approval of Examiners Estimation, Courses, Thesis, University Award, University Approved Associated Prof. Joint supervision with other countries, Recorded Date

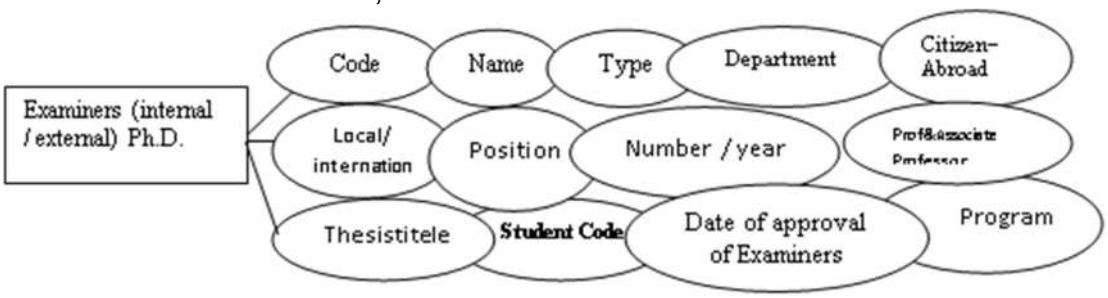


**Fig.4. Entity of Examiners (internal / external) Ph.D. Construction**

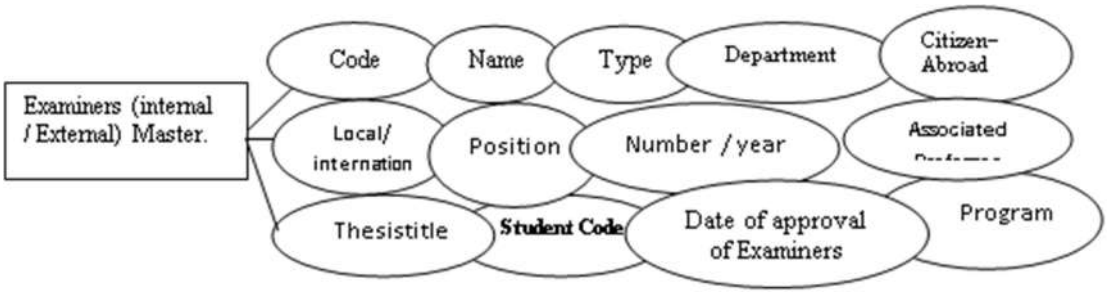


**Fig.5. Entity of Examiners (internal / external) Master. Construction**

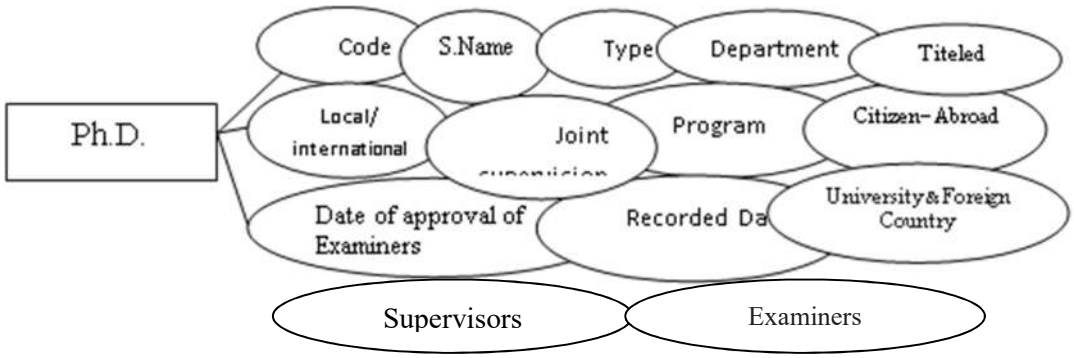


**Fig.6. Entity of Ph.D. Construction**

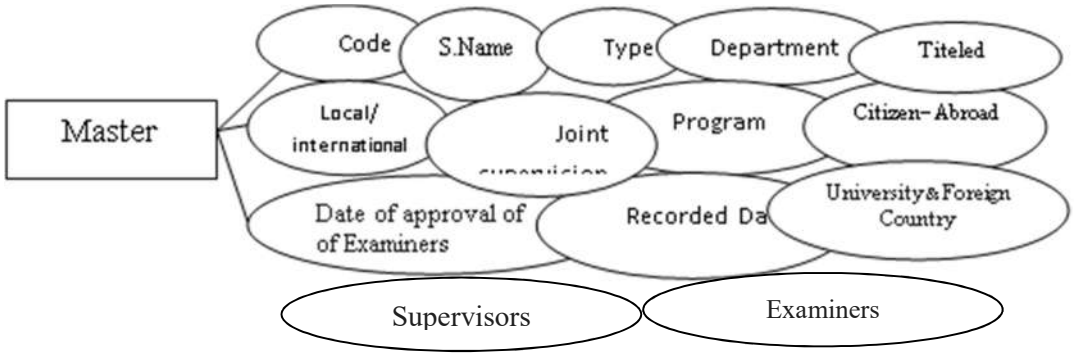


**Fig.7. Entity of Master Construction**

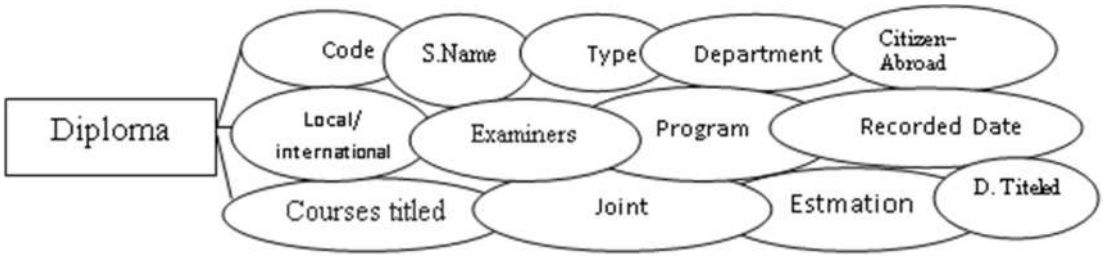


**Fig.8. Entity of Diploma Construction**

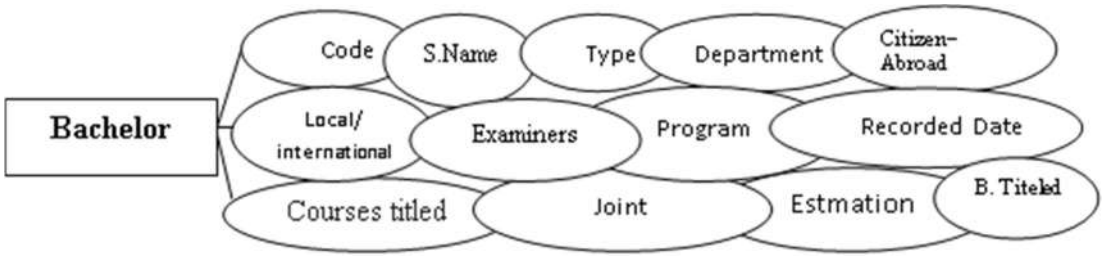


**Fig.9. Entity of Bachelor Construction**

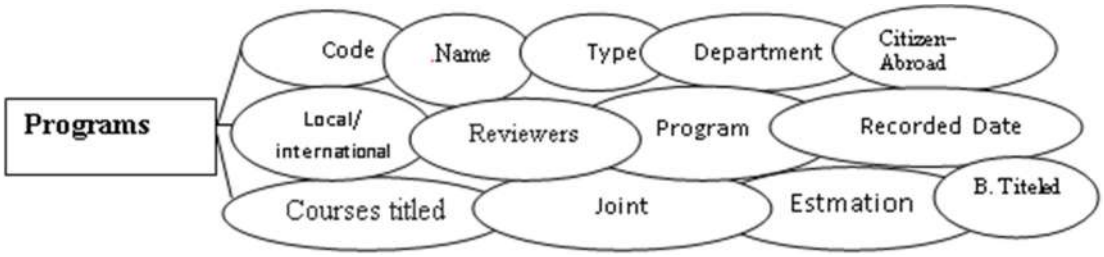


**Fig.10. Entity of Programs Construction**

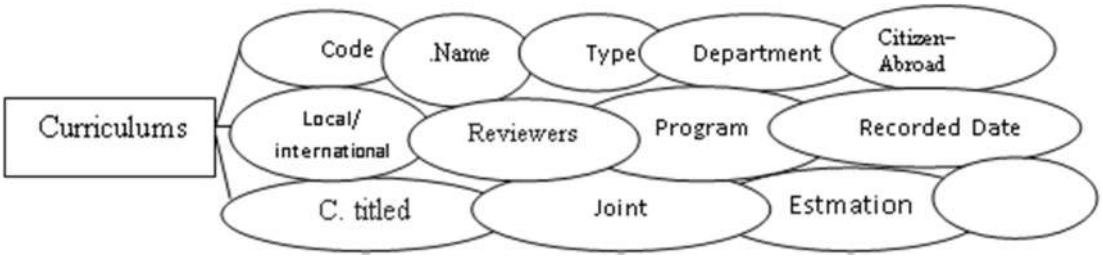


**Fig.11. Entity of Curriculums Construction**

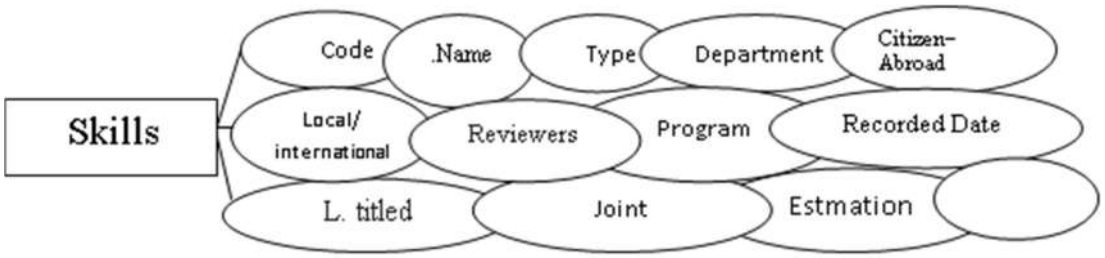


**Fig.12. Entity of Skills Construction**

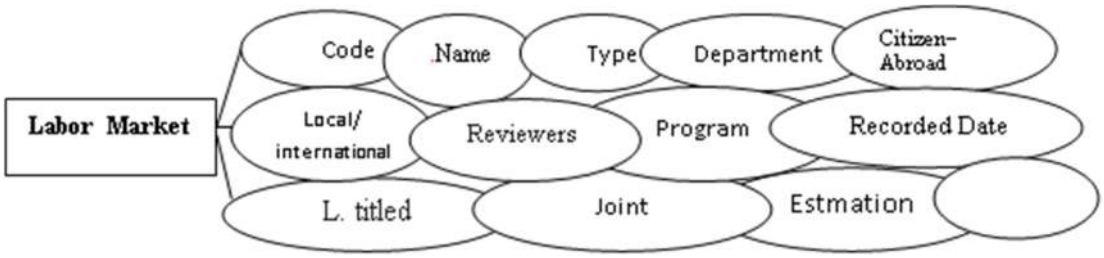


**Fig.13. Entity of Labor Market Construction**

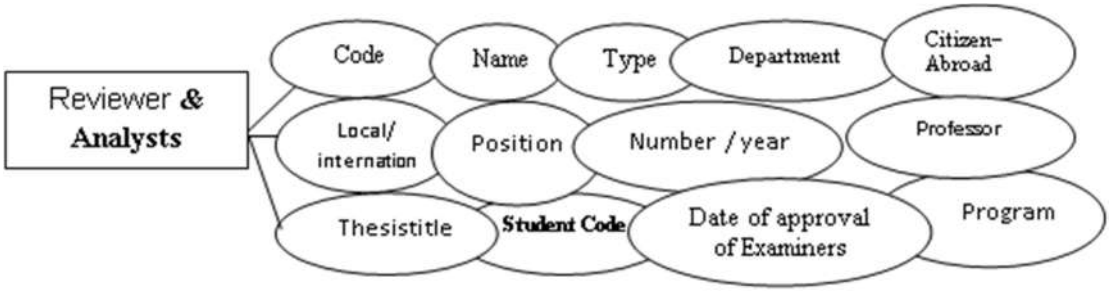


**Fig.14. Entity of Reviewer & Analysts Construction**

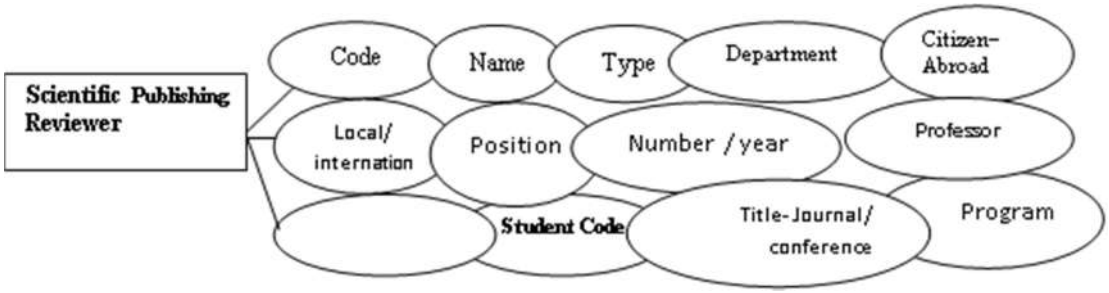


**Fig.15. Entity of Scientific Publishing Reviewer Construction**

These methods have been under continuous scrutiny by psychologists working in the domain of behavioral decision support systems theory. Normative systems are usually based on graphical probabilistic models which are representations of the joint probability distribution over a model's variables in terms of directed graphs. Directed graphs, The former denote variables that are under the decision support systems maker's control and can be directly manipulated, Once a model has been created, it is optimized using formal decision-theoretic algorithms. Decision support systems, analysis is based on the empirically tested paradigm that people are able to reliably store and retrieve their personal beliefs about uncertainty and preferences for deferent outcomes, but is much less reliable in aggregating these fragments into a global inference. The role of decision support systems analytic (DSSPREESS) is to support them in their weaknesses using the formal and theoretically sound principles of statistics. The approach taken by Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector (DSSPREESS) analysis is compatible with that of(DSSPREESS) The goal of

decision support systems analysis is to provide insight into a decision support systems. This insight, consisting of the analysis of all relevant factors, their uncertainty, and the critical nature of some assumptions, is even more important than the actual recommendation.

### 3.3. INTERNAL LEVEL AND MIXED SYSTEMS

In many business and Education problems, interactions among model variables can be described by equations which, when solved simultaneously, can be used to predict the effect of Postgraduate and Research` Examiners and Reviewers, One special type of simultaneous equation model is known as the structural equation model (SEM), which has been a popular method of representing systems in econometrics. An equation is structural if it describes unique, independent causal mechanism acting in the system. Structural equation models offer significant advantages for policy making. Often a decision maker confronted with a complex system needs to decide not only the values of policy variables but also which variables should be manipulated. A change in the set of policy variables has a profound impact on the structure of the problem and on how their values will propagate through the system.

### 3.4. USER INTERFACES

Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector while the quality and reliability of modeling tools and the internal architectures of (DSSPREESS) are important, the most crucial aspect of (DSSPREESS) is by far their user interface. As shown in Fig.16: main window of user interfaces "basic data" as dropdown window, and Fig.20: Main Window of User Interfaces "basic Data" Scientific Publishing Reviewer" Internal and External".Systems with user interfaces that are cumbersome or unclear or that require unusual skills are rarely useful and accepted in practice. The most important result of a session with a (DSSPREESS) is insight into the decision support system for postgraduate and research` Examiners of Educational Studies Sector (DSSPREESS) In addition, when the system is based on normative principles, in Fig.17: main window of user interfaces "Exact Sample" as dropdown window, it can play a tutoring role; one might hope that users will learn the domain model and how to reason with it over time, and improve their own thinking. a good user interface to Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector (DSSPREESS) should support model construction and model analysis, reasoning about the problem structure in addition to numerical calculations and both choice and optimization of decision support systems variables. We will discuss these in the following sections. Support for model construction and model analysis user interface is the vehicle for both model construction and for investigating the results. Even if a system is based on a theoretically sound reasoning scheme, its recommendations will be as good as the model they are based on. Furthermore, even if the model is a very good approximation of reality and its recommendations are correct, they will not be

followed if they are not understood. Without understanding, the users may accept or reject a system's advice for the wrong reasons and the combined decision-making performance may deteriorate even below unaided performance. A good user interface should make the model on which the system's reasoning is based transparent to the user. Modeling is rarely a one-shot process, and good models are usually refined and enhanced as their users gather practical experiences with the system recommendations. It is important to strike a careful balance between precision and modeling efforts; some parts of a model need to be very precise while others do not. A good user interface should include tools for examining the model and identifying its most sensitive parts, which can be subsequently elaborated on. Systems employed in practice will need their models refined, and a good user interface should make it easy to access, in Fig.18,19: main window of user interfaces "Reports" as dropdown window.

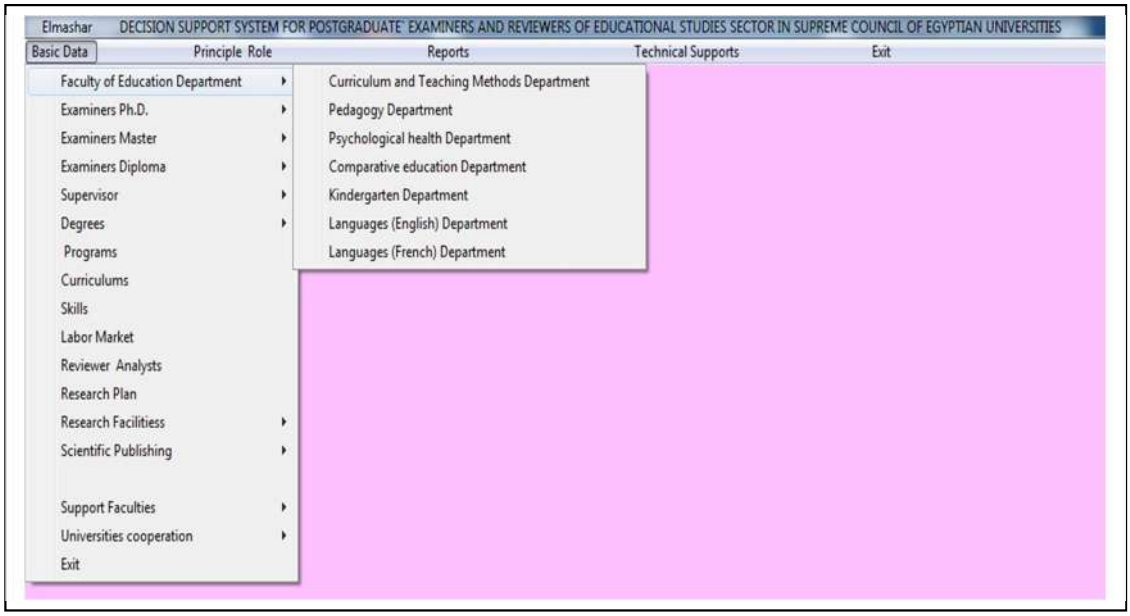


**Fig.16. Main Window of User Interfaces "Basic Data"**

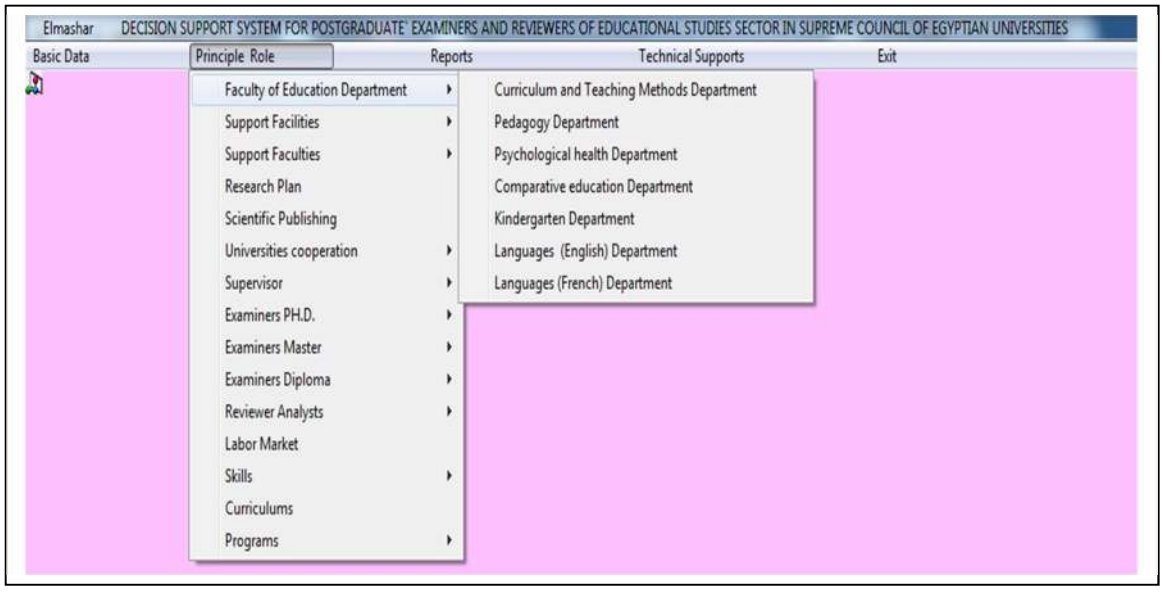


**Fig.17. Main Window of User Interfaces "Exact Sample"**

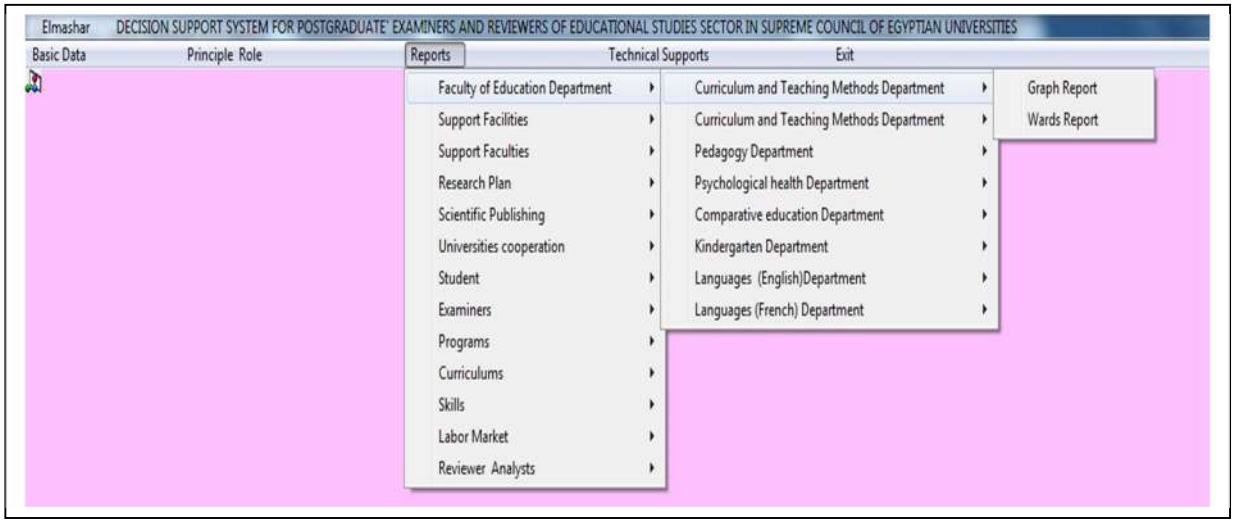


**Fig.18. Main Window of User Interfaces "Reports Sample" Department of Faculty of Education**

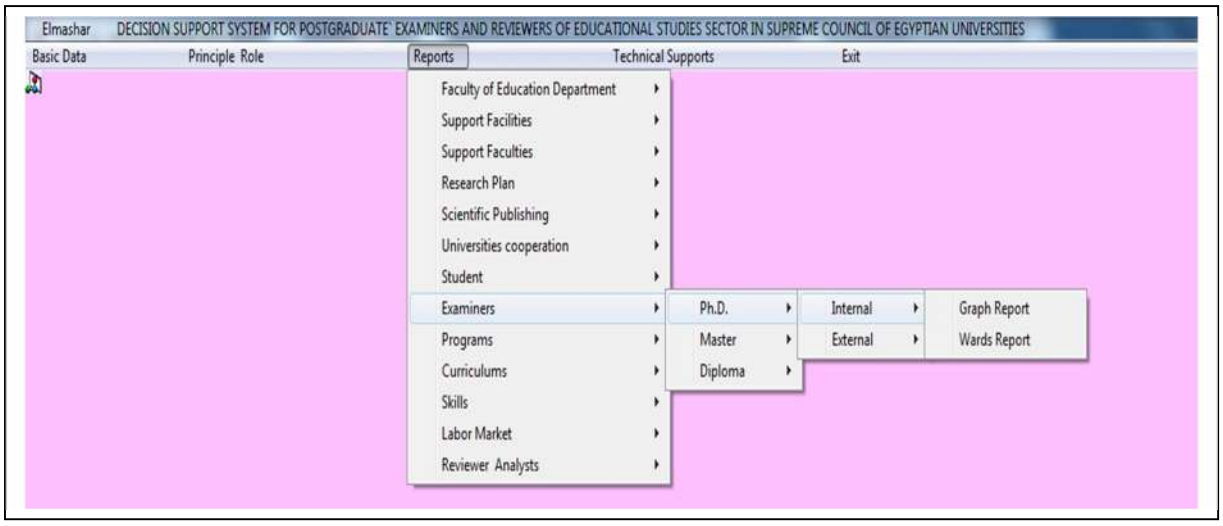


**Fig.19. Main Window of User Interfaces "Reports" PH.D. Examiners Internal and External**

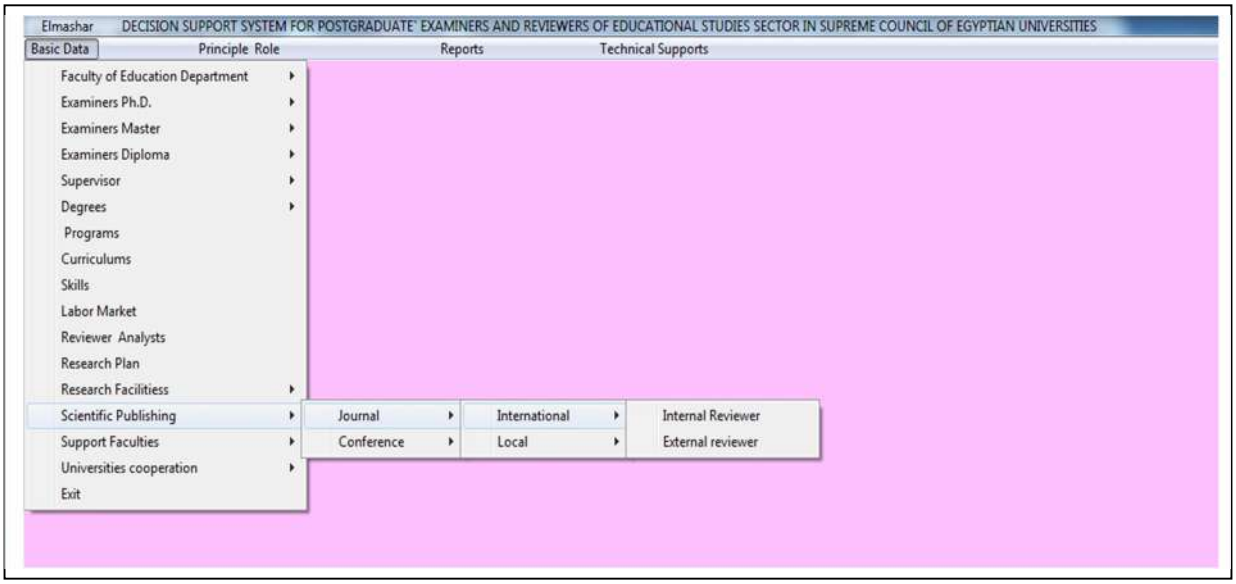


**Fig.20. Main Window of User Interfaces "basic Data" Scientific Publishing Reviewer "Internal and External"**

Support for reasoning about the problem structure in addition to numerical calculations.

While numerical calculations are important in Decision Support System for Postgraduate and Research` Examiners of Educational Studies Sector (DSSPREESS) reasoning about the problem structure is even more important. Often when the system and its model are complex it is insightful for the decision support systems, maker to realize how the system variables are interrelated. This is helpful in designing creative decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) options but also in understanding how policy decision support systems will impact the objective.

### 3.5. OPTIMIZATION OF (DSSPREESS)

Many decision support systems have an inflexible structure in the sense that the variables that will be manipulated are determined at the model-building stage. This is not very suitable for planning of the strategic type when the object of the decision support systems making process is identifying both the objectives and the methods of achieving them. For example, changing policy variables in a spreadsheet-based model often requires that the entire spreadsheet be rebuilt. If there is no support for that, few users will consider it as an option. This closes the world of possibilities for inflexible reframing of a decision support systems, problem in the exploratory process of searching for opportunities. Support for both choice and optimization of decision support systems, variables should be an inherent part of (DSSPREESS).

### 3.6. GRAPHICAL INTERFACE

Insight into a model can be increased greatly at the user interface level by a diagram representing the interactions among its components; for example, a drawing of a graph on which a model is based, such as in Postgraduate and Research` examiners and reviewers Structures, This graph is a qualitative, structural explanation of how information from the independent variables to the dependent variables of interest. As models may become very large, it is convenient to structure them into submodels, groups of variables that form a subsystem of the modeled system. Such submodels can be again shown graphically with interactions among them, increasing simplicity and clarity of the interface. As example in postgraduate and research` examiners and reviewers shows a submodel-level view of a model developed in (DSSPREESS). Note that the graph in Entity is an expanded version of the teaching expenditures submodel in components models of decision support system for postgraduate and research` examiners and reviewers (DSSPREESS). The user can navigate through the hierarchy of the entire model in her quest for insight, opening and closing submodels on demand. Some pointers to work on user interfaces of decision-analytic systems can be found in.

### 3.7. ASSESSMENT TO DEVELOPED SYSTEM

To evaluate the system developed from the point of view of ease of use, usage, adaptability, expandability, ease of data update and cost to operate. The system design has been carried out with ease of use being one of the highest criteria in the design of the software. It has an extremely user-friendly Graphic User Interface (GUI). This allows the obtainment of all statistics and information with a few mouse clicks. All selections are given as a combo-box presentation allowing point and click operation. The only place for user data entry is when using the student search engine.

The software has not yet entered widespread use. However, two different configurations have been developed. The advantage of the client-server version is that a central database can be maintained which will be updated centrally and all client user names and passwords can be controlled at the server side, hence allowing security and confidentiality. The software is highly adaptable and expandable due to its modular nature of design based on software engineering principles. Additional functionality can be added using the Toolbox section, while adaptability to other university databases is provided by the use of a novel Database. In this way, any university database can be filtered and interfaced to the software using the facilities provided. The data update is the most time consuming operation within the software. As the data update involves the pre-filtering and formation of the new database, it takes a rather long time. However this is well worth waiting for since the database access is then almost instantaneous even for the most difficult search operations. There is no cost to operate the software as it can be used by non-experts. The only cost foreseen is in the maintenance of the client-server version of the software. This will need the attention of an operator in order to manage access, privileges, user profiles and data update over the network.

### 4. CONCLUSION

This system given away of educational studies sector in supreme council of Egyptian universities to the expertise, innovation, collaboration, accountability, integrity between the faculties of education as technology for the renaissance and sustainability development of the faculties of education in Egypt. We believe that the proposed approach will deliver a number of benefits and address concerns about the current model. It will ensure a high core level of quality and standards, coherently applied across Egypt, and other sectors of Egyptian Education within a wider academic infrastructure that can accommodate different national approaches, as in Engineering. It will introduce a greater focus on student outcomes, and provide useful, accessible information for students and employers. It will free up providers' resources to focus on their core activities, while encouraging enhancement and the sharing of good practice. And finally, it will protect the international reputation of Egyptian higher education. decision support system for postgraduate and research` Examiners of educational

studies sector (DSSPREESS) are powerful tools integrating scientific methods for supporting complex decision support systems, with techniques developed in information science, and are gaining an increased popularity in many domains throughout the theoretical and analytical of this paper which led us for new 190 investigation research point. They are especially valuable in situations in which the amount of available information is prohibitive for the intuition of an unaided human decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) maker and in which precision and optimality are of importance. Decision support systems aid human cognitive deficiencies by integrating various sources of information, providing intelligent access to relevant knowledge, aiding the process of structuring, and optimizing decision support systems. Normative decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) offer a theoretically correct and appealing way of handling uncertainty and preferences in decision support system for postgraduate and research` examiners of educational studies sector (DSSPREESS) They are based on carefully studied empirical principles underlying the discipline of decision support systems, analysis and they have been successfully applied in many practical systems. We believe that they offer several attractive features that are likely to prevail in the long run as far as the technical developments are concerned.

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# ТРАНСФЕР НА ЦВЕТОВЕ ОТ НАРОДНА НОСИЯ КЪМ СЪВРЕМЕННИЯ ТЕКСТИЛ

**Елсайед А. Елнашар, Станка Байчева, Златин Златев, Петя Бонева**

***Резюме***: Един от характерните елементи от Българската народна култура е носията. За да бъде запазена автентичността на елементите от националните костюми или за използването на цветовете и формите на декоративните елементи от това облекло за създаване на десени, декорация на облекла, интериорен дизайн, на съвременен етап се прилагат техники за компютърна обработка. Цветовете на елементите от народната носия са измерени с видео камера и колориметър. Изведени са коригиращи уравнения за съответствието им. Направено е анкетно проучване върху предпочитанията на потребителите за текстилни десени с различни цветови комбинации от получените цветове. Анализирано е мнението на потребителите при избор на елементи от интериорния дизайн. Резултатите показват, че цветовете на елементи от народната носия са предпочитани от потребителите и могат да бъдат използвани при проектирането на съвременни текстилни тъкани.

***Ключови думи***: Народна носия, цветове, текстилни тъкани, ABC-XYZ анализ, Анализ на главните компоненти

## 1. Увод

За да се подсигури композиционно-естетична цялост на формата могат да се прилагат разнообразни творчески подходи. Такъв подход е трансферът на цветове и форми от миналото в съвременния текстил [5,7,9].

За да бъде запазена автентичността на

# TRANSFER OF COLORS FROM TRADITIONAL COSTUME TO MODERN TEXTILES

**Elsayed A. Elnashar, Stanka, Baycheva, Zlatin Zlatev, Petya Boneva**

***Abstract***: One of the characteristic elements of the Bulgarian folk culture is the costume. In order to preserve the authenticity of the elements of the national costumes or the use of the colors and shapes of the decorative elements of this garment to create patterns, decoration of garments, interior design, computer processing techniques are applied at a modern stage. The colors of the costume elements are measured with a video camera and a colorimeter. Correction equations for their compliance have been issued. A survey was conducted on consumer preferences for textile designs with different color combinations of the colors obtained. It is analyzed the opinion of the users when choosing elements of the interior design. The results show that the colors of the costume elements are preferred by consumers and can be used in the design of modern textile fabrics.

***Keywords***: National folk costume, colors, textile fabrics, ABC-XYZ analysis, Principal component analysis

## 1. Introduction

Various creative approaches can be applied to ensure the composition-aesthetic integrity of the form. Such an approach is the transfer of colors and forms of the past into modern textiles [5,7,9].

In order to preserve the authenticity

елементите от националните костюми или за използването на цветовете и формите на декоративните елементи от това облекло за създаване на десени, декорация на облекла, интериорен дизайн, на съвременен етап се прилагат техники за анализ и обработка на изображения, CAD системи [3,7,8].

Носията е един от характерните елементи от Българската народна култура. Това е традиционно облекло, което има специфично значение във всекидневните и празнични дейности на българина. Всеки регион на България има своя носия с характерни мотиви, които не се повтарят никъде другаде.

Типична за района на Югоизточна Тракия е сукманената носия. Тя е съставена от риза, сукман, престилка и пояс, като декорацията с характерна украса е най-забележима по полите и деколтето на сукмана.

Целта на статията е да се направи анализ на цветове на народна носия от Югпизточна тракия и да се предложат решения за съвременния текстил.

**2. Материал и методи**

Използвана е народна носия от Югоизточна Тракия, България, Елховски регион, предоставена от личен архив.

Заснети са изображения на 5 основни елемента на народната носия, които са с характерни цветове и бродерии. Изображенията са получени с цифрова видеокамера Olimpus C-310.

Получените цветове са конвертирани от RGB в Lab цветови модел. За разлика от RGB или CMYK цветовите модели, които са хардуерно зависими, L (Lab) компонентата не влияе на наситеността на цветовете, а отчита изменението в осветеността. Преобразуването на стойностите на цветовите компоненти от RGB в Lab е представено в [2].

of the elements of the national costumes or the use of the colors and shapes of the decorative elements of this garment to create patterns, clothing decoration, interior design are used image processing techniques, CAD systems [3,7,8].

Costume is one of the characteristic elements of Bulgarian folk culture. This is traditional clothing, which has a specific meaning in the everyday and festive activities of the Bulgarian. Every region of Bulgaria has its costume with characteristic motifs, which are not repeated anywhere else.

Typical for the region of Southeastern Thrace is the sukman costume. It is made up of a shirt, a sukman, an apron and a girdle, and the decoration with distinctive decoration is most noticeable at the skirts and the neck of the sukmana.

The aim of the article is to analyze the colors of folk costumes from Southeastern Thrace and to propose solutions for modern textiles.

**2. Material and methods**

A folk costume from Southeastern Thrace, Bulgaria, Elhovo region was used, provided by a personal archive.

Images of 5 basic elements of folk costume, which are characteristic colors and embroideries, are captured. The images are obtained with the Olympus C-310 digital video camera.

The resulting colors are converted from RGB to Lab color model. Unlike RGB or CMYK color models that are hardware-dependent, the L (Lab) component does not affect color saturation, but takes into account the change in brightness. The conversion of color components from RGB to Lab is presented in [2].

Корекцията на цветовете е направена, като са сравнени с измерените с колориметър, използващ сензор за цвят TCS34725.

Използван е алгоритъм за получаване на цветове на елементи в изображение, представен в [4].

Проведено е проучване на потребителското мнение за избор на цветови комбинации от елементи на народна носия. Проучването е проведенов град Ямбол, България. Анкетирани са общо 65 респондента. Те са избрани на случаен принцип без оглед на образователна степен, месторабота и пол. Всички анкетирани са запознати с целта на проучването и целта на използване на получените данни.

Резултатите са обработени с ABC-XYZ анализ и метод Анализ на главните компоненти [1,6].

**3. Резултати и дискусия**

На фигура 1 са представени използваните елементи от народна носия. Наблюдават се посочените характерни декорации и цветове, типични за Югоизточна България. Носията е от вълнени и памучни платове с богата бродерия характерна за района. Сукманът е изработен от черен вълнен плат с бродерия на пазвата и полата. Ризата е изработена от бял памучен плат с бродерия на ръкавите. Поясът е вълнен, изтъкан в цветни райета в светли тонове с редуване на червено, жълто, черно. Той е обединителен елемент на цялостната костюмна композиция. Украсата на сукмана по пазвата, полите и по ръкавите се постига предимно с бродерия от цветни кръстати бодове. Характерно за сукманената носия е наличността само на предна престилка. Тя е червена, рязко очертаваща се на черния фон на сукмана. Пъстротата ѝ е допълвана с цветна

The color correction is made by comparison with the colorimeter measured using the TCS34725 color sensor.

It is used an algorithm for obtaining colors of elements in an image presented in [4].

A consumer opinion survey was conducted to select color combinations from folk costumes. The survey was conducted in Yambol, Bulgaria. A total of 65 respondents were interviewed. They are randomly selected regardless of educational level, place of work, and gender. All respondents are aware of the purpose of the study and the purpose of using the data obtained.

The results were processed by ABC-XYZ analysis and principal component analysis [1,6].

**3. Results and discussion**

Figure 1 shows the used folk costume elements. The decorations and colors typical for Southeastern Bulgaria are observed. It is made of wool and cotton fabrics with rich embroidery characteristic of the region. Sukman is made of black woolen cloth with embroidery on the bosom and skirt. The shirt is made of white cotton cloth with embroidery on the sleeves. The girdle is wool woven in colored stripes in bright colors with alternating red, yellow, black. It is a unifying element of the overall costume composition. The decoration of the sukman on the bosom, skirts and sleeves is achieved mainly with embroidery of colored cross stiches. Typical of the sukmann costume is the availability of a front apron only. It is red, abruptly depicting the black background of the sukman. Its color is

бродерия.

complemented by color embroidery.

E1 — Пояс / Girdle

E2 — Пазва, сукман / Axilla, sukman

E3 — мотиви, престилка / Motifs, apron

E4 — Пазва, риза / Axilla, shirt

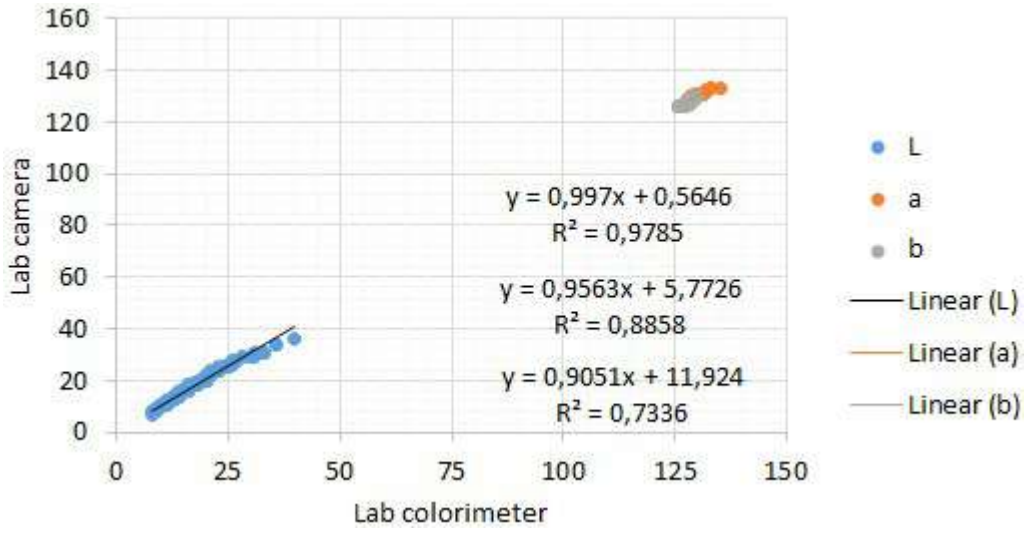
E5 — Терлик / Slipper

**Фиг.1. Използвани елементи от народна носия**

**Fig.1. Used elements from national folk costume**

На фигура 2 са представени резултати от корекция на измерените с видео камера стойности в Lab цветови модел. Резултатите показват, че стойностите на цветовите компоненти, получени с видео камера са близки до тези измерени с колориметър.

Figure 2 shows the results of the correction of the video camera measured values in the Lab color model. The results show that the color components obtained with a video camera are close to those measured with a colorimeter.




**Фиг.2. Корекция на измерените с видеокамера стойности на Lab цветови компоненти**

**Fig.2. Correction of the measured Lab color values with camera**

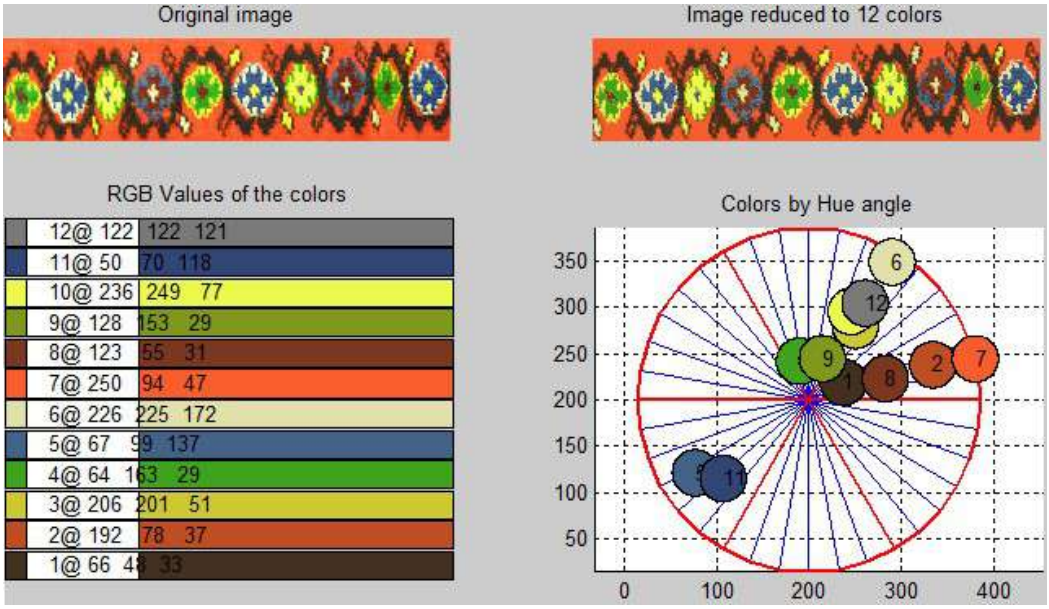
На фигура 3 е представен пример за получаване на цветове от елемент E3 от народна носия. Оригиналното изображение е редуцирано до 12 основни цвята. Представени са общият вид на цветовете във вид на ленти, върху които са посочени стойностите на RGB цветовите компоненти за

Figure 3 shows an example of obtaining colors from a costume element E3. The original image is reduced to 12 basic colors. The general appearance of the colors in the form of strips, on which the values of the RGB color components for the respective color are

съответния цвят. Получените цветове са нанесени в Lab цветно колело. За представеният пример на мотив от престилка се вижда, че основно са използвани родствени цветове. Преобладаващи са зеленото, червеното, синьото, жълтото.

indicated. The resulting colors are applied to the Lab color wheel.

For the example of an apron motif, it is apparent that kinship has been used. The green, the red, the blue, the yellow are predominant.

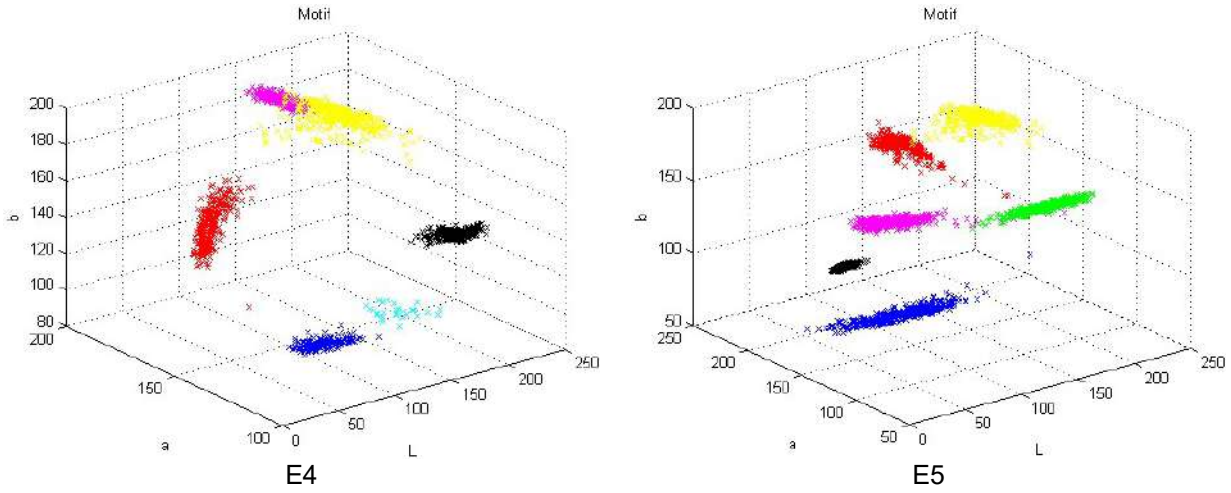



**Фиг.3. Получаване на цветове от елемент на народна носия**

**Fig.3. Obtaining the colors from national costume element**

На фигура 4 е представено разпределението на цветовете в Lab цветовото пространство за елементите. Наблюдава се използването на контрастни цветове и по-малко родствени.

Figure 4 shows the color distribution in the Lab color space for the elements. There is the use of contrasting colors and less complementary.




**Фиг.4. Разпределение на цветовете в елементи на народна носия**

**Fig.4. Distribution of the colors of national costume elements**

В таблица 1 са представени коригираните стойности на избрани цветове от елементите

Table 1 shows the adjusted values of selected colors of the costume

на народната носия, предствени в RGB и Lab цветови модели. Цветовете са означени с C1-C10. Направена е визуализация в техният общ вид.

**Таблица 1.**
**Цветове на елементи от народна носия**

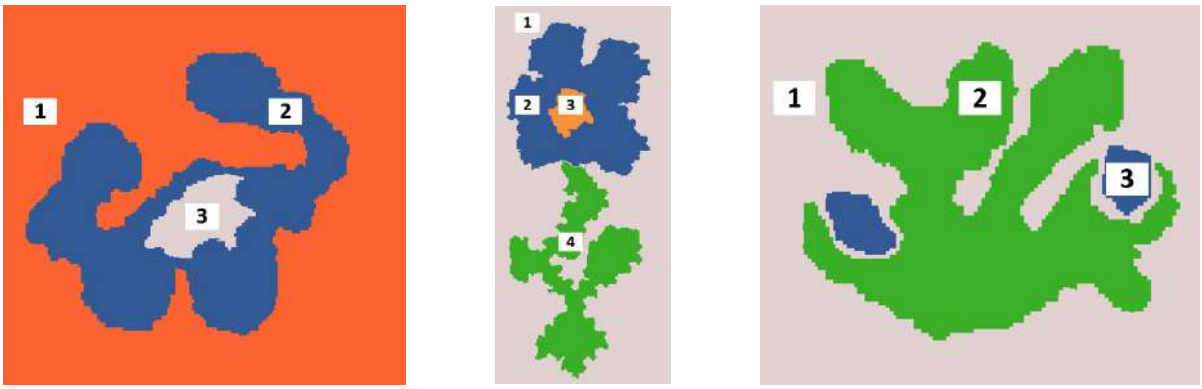
| № | Наименование<br>Name | Общ вид<br>General view | R | G | B | L | a | b |
|---|---|---|---|---|---|---|---|---|
| C1 | Лилав<br>Purple | | 180 | 55 | 125 | 44 | 56 | -12 |
| C2 | Светло син<br>Light blue | | 90 | 130 | 150 | 52 | -9 | -15 |
| C3 | Тъмно син<br>Dark blue | | 52 | 90 | 149 | 38 | 6 | -36 |
| C4 | Бял<br>White | | 225 | 210 | 210 | 85 | 5 | 2 |
| C5 | Черен<br>Black | | 25 | 20 | 25 | 7 | 4 | -3 |
| C6 | Светло червен<br>Light red | | 253 | 45 | 50 | 55 | 75 | 50 |
| C7 | Тъмно червен<br>Dark red | | 150 | 25 | 25 | 32 | 50 | 34 |
| C8 | Жълт<br>Yellow | | 250 | 145 | 60 | 70 | 33 | 60 |
| C9 | Светло зелен<br>Light green | | 105 | 180 | 125 | 67 | -35 | 21 |
| C10 | Тъмно зелен<br>Dark green | | 60 | 175 | 40 | 63 | -56 | 56 |

На фигура 5 са представени използваните в анкетата елементи и техните цветови комбинации.

elements presented in RGB and Lab color models. Colors are labeled C1-C10. A visualization has been made in their general form.

**Table 1.**
**Colors from elements of national folk costume**

Figure 5 presents the elements used in the survey and their color combinations.




M1, C7-C8-C9
M2, C4-C6-C9
M3, C3-C4-C8
M4, C3-C4-C6
M5, C4-C5-C10
M6, C1-C4-C7

M7, C3-C4-C8-C9
M8, C4-C5-C7-C10
M9, C1-C4-C7-C9
M10, C3-C4-C8-C10
M11, C3-C6-C8-C10
M12, C2-C5-C7-C9
M13, C3-C4-C8-C10

M14, C3-C4-C8
M15, C5-C7-C9
M16, C2-C4-C6
M17, C3-C4-C8
M18, C1-C4-C10
M19, C3-C4-C10
M20, C3-C6-C10

**Фиг.5. Елементи и техните цветови комбинации**

**Fig.5. Elements and their color combinations**

Номерирани са тези области от

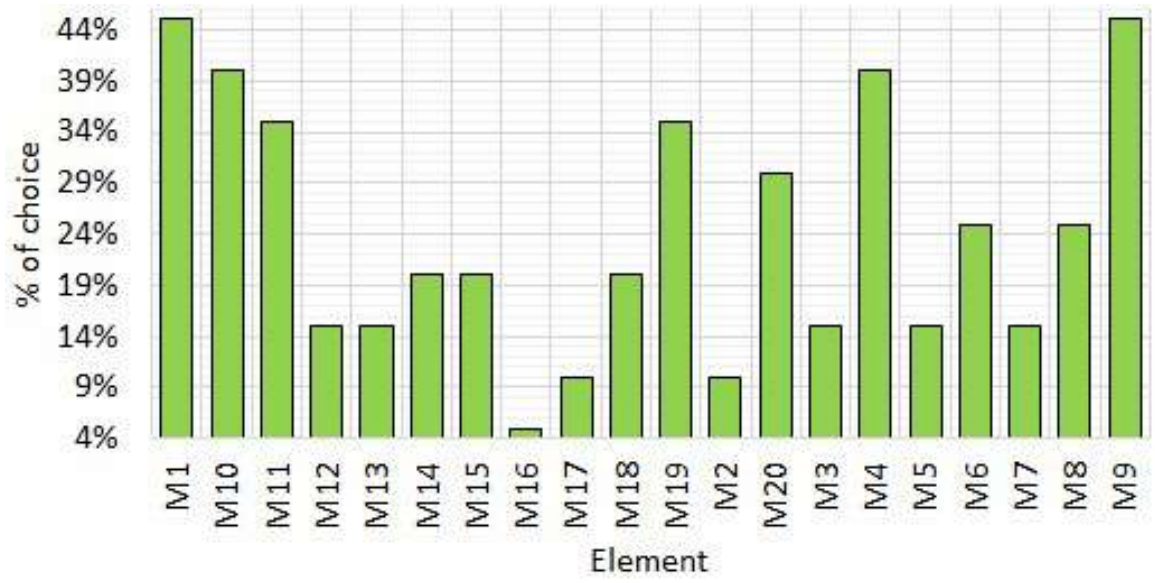
These areas of the image to which

изображението, към които са приложени цветовете. Елемент М1 и елемент М3 са с по 3 коригирани цвята, а елемент 2 с 4.

На фигура 6 са представени резултатите от анкетата. По хоризонталната ос са нанесени елементите, а по вертикалната процентът от респонденти, които са избрали съответният елемент. Голям процен от анкетираните (39-44%) са избирали елементите с комбинации М1, М4, М9 и М10.

the colors are applied are numbered. Element M1 and element M3 have 3 corrected colors and element 2 with 4.

Figure 6 presents the survey results. The horizontal axis is applied to the elements and the vertical percentage of respondents who have chosen the element. A large percentage of respondents (39-44%) chose elements with combinations M1, M4, M9 and M10.




**Фиг. 6. Резултати от анкета**

**Fig.6. Results from survey**

В таблица 2 са представени резултатите от ABC-XYZ анализ. Методът е използван за прецизиране на резултатите от направеното проучване. Както се вижда по-често избирани са елементите М1, М4 и М9, които попадат в група А-Х и елементите М10, М11 и М19, попадащи в група В-Х.

Table 2 presents the results from ABC-XYZ analysis. The method is used to refine the results of the study. As can be seen, the M1, M4 and M9 elements belonging to group A-X and the elements M10, M11 and M19 belonging to group B-X are more often selected.

**Таблица 2.**
**Резултати от ABC-XYZ анализ**

**Table 2.**
**Results from ABC-XYZ analysis**

| | A | B | C |
|---|---|---|---|
| **X** | M1, M4, M9 | M10,M11, M19 | - |
| **Y** | - | M3, M5, M6, M8, M14, M15, M18, M20 | M7, M12, M13 |
| **Z** | - | - | M2, M16, M17 |

На база получените резултати е проведено второ проучване на

On the basis of the results obtained, a second consumer

потребителското мнение за избор на интериорни елементи като са използвани резултатите за най-предпочитани елементи от първото проучване.

На фигура 7 са представени използваните варианти за приложение на цветовите комбинации. Реализацията е със средствата на Интернет приложението Digital fabrics. Използвани са различни размери на десените и еднакъв повтор.

opinion survey for the selection of interior elements was conducted using the results for the most preferred elements of the first study. Figure 7 shows the variants used for applying color combinations. The realization is with the tools of Digital fabrics webs application. Different sizes of patterns are used and the same repeat is used.

Вариант 1
Variant 1

Вариант 2
Variant 2

Вариант 3
Variant 3

**Фиг.7. Пример за три варианта на дивани с използване на цветови комбинации**

**Fig.7. Example of three variants of sofas using color combinations**

В таблица 3 са представени получените резултати от анкетното проучване. Използвани са 6 цветови комбинации и три варианта на размерите на десените. Посочени са десените, на които съответстват избираните цветови комбинации.

Table 3 presents the results of the survey. Six color combinations and three variations of patterns sizes were used. The patterns that match the selected color combinations are indicated.

**Таблица 3.**
**Резултати от анкетно проучване**

**Table 3.**
**Results from survey**

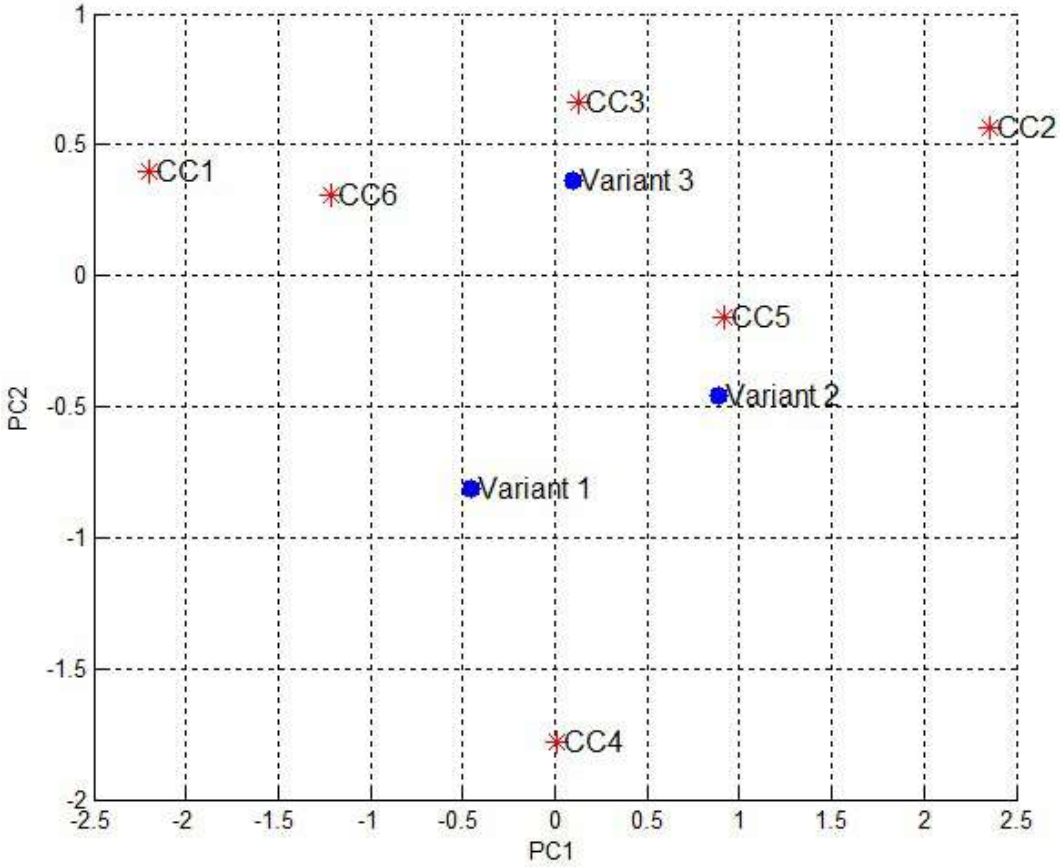
| Цветова комбинация / Color combination<br>Вариант / Variant | CC1=M1 | CC2=M4 | CC3=M9 | CC4=M10 | CC5=M11 | CC6=M19 |
|---|---|---|---|---|---|---|
| Вариант 1<br>Variant 1 | 6 | 4 | 5 | 7 | 5 | 6 |
| Вариант 2<br>Variant 2 | 3 | 7 | 5 | 6 | 6 | 4 |
| Вариант 3<br>Variant 3 | 2 | 3 | 3 | 2 | 2 | 3 |

На фигура 8 са визуализирани получените резултати след прилагане на метод анализ на главните компоненти върху данните от анкетното проучване. Вижда се, че за вариант 3, при който са използвани десени с най-голям размер потребителите предпочитат 1, 2, 3 и 6-та цветови комбинации. При вариант 2 единствено е

Figure 8 shows the results obtained after applying the main components analysis method to the survey data. It can be seen that for variant 3, which uses the largest drawings, users prefer 1, 2, 3 and 6 color combinations. In variant 2, only the 5th color combination is

избирана 5-та цветова комбинация. Подобен резултат се наблюдава и за вариант 1, който е предпочетен само с 1-ва цветова комбинация.

selected. A similar result is also observed for variant 1, which is preferred with only the 1st color combination.




**Фиг.8. Обработка на анкетните данни с метод Анализ на главните компоненти**

**Fig.8. Processing of survey data by principal component analysis method**

## 4. Заключение

Проучването относно методите, използвани за обработка и анализ на анкетни проучвания и други изследвания на взаимовръзки между обекти показа, че за тази цел се използват честотните статистически методи. Подходящ за целта е методът „Анализ на главните компоненти“ преобразуващ суровите данни в признаково пространство с по-ниска размерност и дават по-голяма разграничимост на получаваните резултати, които при съвременните софтуерни продукти за статистически анализ се представят и в графичен вид за по-добра визуализация на резултатите.

Проученото потребителско мнение

## 4. Conclusion

The study on the methods used to process and analyze surveys and other interconnection studies has shown that frequent statistical methods are used for this purpose.

Appropriate for this purpose is the "Principal component analysis" method, transforming raw data into a lower-dimensional character space, and giving greater visibility to the results obtained in modern statistical analysis software products in graphical form for better visualization of the results.

The user opinion survey on the

относно цветовите решения на шестте модули е изследвано с помощта на анализа на главните компоненти, с чиято помощ са визуализирани степените на взаимовръзките между модул и цветова комбинация.

Резултатите от изследването показват, че потребителите предпочитат елементи с голям размер, които да бъдат комбинирани с родствени или контрастни цветове, а останалите орнаменти – с родствено-контрастни цветове. Непредпочитани от потребителите са комбинациите с участието на червено и жълта, а предпочитани са тези с участието на синьо, зелено или цветове от синята и зелената гама. Предпочитани цвятове в десените са синият, червения и зеления.

color solutions of the six modules has been explored using the analysis of the main components to help visualize the degrees of interconnection between the module and the color combination.

The results of the study show that consumers prefer large-size items to be combined with complementary or contrast colors, while the other ornaments – only with contrasting colors.

Red and yellow combinations are not preferred by users. Blue, green or blue and green colors being preferred. Preferred colors in the patterns are blue, red and green.

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# ECO PRINTING OF COTTON WITH REACTIVE DYES

**Geeta Mahale**

***Abstract***: There have been a number of options developed to overcome the polluted effluent problem of dyeing cotton fabric with reactive dyes. This paper reviews the options to improve sustainability of the dyeing process through development of reactive dyes, modification of dyeing machinery and processes, chemical modification of cotton brief prior to dyeing, use of biodegradable organic compounds in dye bath formulation.

Most cotton fabrics are dyed with reactive dyes because they produce a full range of bright fashion colours with a high degree of wash fastness. Application of these dyes, however, causes high and undesirable levels of dissolved solids and oxygen demand in the effluent. This is due to the use of considerable quantities of inorganic salt and alkali to ensure efficient utilization and fixation of the reactive dyes. Dye that is unfixed on cotton also contributes to effluent pollution. There are two approaches to deal with the effluent problem:

1. alternative dyeing techniques and technology;
2. Effluent treatment after dyeing. The effluent treatment requires additional capital investment and high treatment and maintenance costs.

Therefore, the first approach is always preferable. There have been a number of options developed to overcome the polluted effluent problem of dyeing cotton fabric with reactive dyes. This paper reviews the options to improve sustainability of the dyeing process through development of reactive dyes, modification of dyeing machinery and processes, chemical modification of cotton brief prior to dyeing, use of biodegradable organic compounds in dye bath formulation. Printing of cellulosic fabrics with reactive dyes produce brilliant shades with very good colour fastness and leveling properties. It is conventional to use urea with sodium alginate, a biocompatible natural polymer as the thickening agent for reactive dye print pastes.

Use of biodegradable organic compounds in dye bath formulation and the use of alternative biodegradable non-toxic dyes and chemicals for dyeing is a direct approach of reducing the effluent pollution. Urea reduction or elimination in reactive dye print pastes is of ecological interest. Use of urea poses ecological problems associated with the high nitrogen content of the printing effluent. Different approaches have been reported on the elimination or replacement of urea in cellulose printing. Use of selected organic compounds has been shown to be an effective alternative to inorganic salt (Rucker and Guthrie,1997).Such compounds reduce effluent load, as most of these tend to be biodegradable. Betaine, an organic compound, has been reported to reduce the amount

of inorganic salt (Liu and Yao, 2009). Organic cationic surfactants have also been studied as inorganic salt substitutes (Rucker and Guthrie, 1997). The use of a mixture of magnesium-based organic compounds in the dyeing of cotton with direct or reactive dyes has been patented (Moore, 1993). The mixture is claimed to substitute inorganic sodium chloride or sodium sulphate that prevents the discharge of untreatable toxic effluent. However, this could not be commercialised because magnesium ions cause water hardness and create problems with colour matching and dyeing process control (Jain and Mehta,1991). The sodium salts of organic acids have been explored as alternatives to sodium chloride and sodium sulphate. Prabu and Sundrajan (2002). have demonstrated the use of trisodium citrate as an alternative to traditional inorganic salts for exhaust dyeing of cotton with reactive, direct and solubilised vat dyes. Salts of polycarboxylic acids have also been shown to be the most effective alternatives to inorganic salts (Guan et al.2007). The tetrasodium ethylene diamine tetra-acetate, an alkaline polycarboxylic sodium salt, has been reported as an alternative to inorganic salt and alkali in exhaust (Ahmed, 2005) and continuous pad-steam dyeing (Khatri, 2011) of cotton with reactive dyes. The use of other alkaline polycarboxylic salts (Khatri et al., 2010), such as trisodium nitrilotriacetate.

(Khatri et al., 2013) and tetrasodium N,N-bis(carboxylatomethyl)-L-glutamate (Khatri and Peerzada, 2012), has also been shown to effectively substitute the inorganic salt and alkali in continuous pad-steam reactive dyeing of cotton. This development led to reducing effluent TDS and improve dye fixation efficiency. In the continuous pad-dry-bake reactive dyeing method, where urea is used, the process conditions result in some decomposition of the urea. That causes an increase in the residual nitrogen content and to some extent reduces the yield of dye-fibre reaction. Using reduced amount of urea with a dicyandiamide in the dyebath has been proposed to reduce the environmental impact (Phillips,1996).

Different factors that may affect the printability of cotton, such as the concentrations of thickener, urea, dye, absence or presence of alkali and steaming time in the prints with respect to the dye fixation, colour strength. dye penetration, leveling and the fastness properties. The aim of this study is to examine the use of an environmentally-safe and non-toxic biodegradable organic salt, as a substitute for urea-in the conventional reactive dye print pastes and its viability for dye-fibre fixation.

**Objectives**

1. To find out the suitability of Reactive printing dyes ,thickeners and urea substitute on Cotton
2. To assess the printability of cotton with respect to dye fixation, colour strength and fastness properties
3. To estimate Cost of production of eco-printed Cotton.

**METHODOLOGY**

**Printing of Cotton With Reactive Dyes**

**1. Procurement of raw materials**

**A. Five Reactive dyes** -Indian dye stock company,Banglore

1. Procion Reactive Black - HE4B
2. Procion Reactive Turquoise blue-S7G
3. Procion Reactive green-SE4G
4. Procion Reactive red-H48B
5. Procion Reactive Yellow- H8B

**B. Substrates – Organic cotton (OC- 29'S) and Khadi Cotton (KC-8'S)**

**2. Materials required for printing ---**

1 Dye
2 Water
3 Urea-30g **substituted with-** Sodium Acetate/ Sodium Formate/ Sodium Editate/Tri sodium acetate
4 Resist salt-LSodium alginate
5 Sodium carbonate($Na_2CO_3$)-10g

**3. Printing Recipe for**

| | | |
|---|---|---|
| 1 | Colour | 30g |
| 2 | Water | 120cc |
| 3 | Urea | 30g |
| 4 | Resist salt-L | 10g |
| 5 | Sodium alginate | 300g |
| 6 | Sodium carbonate($Na_2SO_3$) | 10g |
| | **Total** | **500 gms** |

**4. Procedure:**

Sodium alginate was soaked over night. Dye paste was made with warm water

Urea/ Sodium Acetate/ Sodium Formate/ Sodium Editate/Tri Sodium Acetate is added to dye solution and stirred. Then, resist salt and sodium carbonate is added and mixed thoroughly. Mixed sodium alginate gum to this prepared dye paste.* Printing was carried out at Khadhi Village Industries Commission, Bengeri, Hubli.

**5. Post treatment**

Printed silk samples of different colours were air dried at room temperature for 24 hours and mounted in a super heated fabric steamer with superheated steam at $110^0$ C for five minutes.

**1. <u>The test specimen were assessed</u>** for the –

Colour strength (K/S)
Reflectance (RFL)
Colour coordinate (ΔLab)
Colour difference (ΔE)

} *"Minolta CM- 600/700 d",* Colour Spectro Photometer

## RESULTS AND DISCUSSION

Except Urea treated Green printed cotton samples (Table 1a), rest all samples indicated greater values of colour strength (K/S). Whereas except Green, other printed samples showed lower values of reflectance (RFL). Blue attained least Total colour difference (Table 1b) for OC and KC (ΔE - 1.210 & 1.174) samples treated with Urea.

**Table 1a.**

**Colour strength (K/S) and Reflectance (RFL) values of reactive printed, <u>urea</u> treated organic and khadi cotton samples**

| Colour | Organic Cotton | | Khadhi Cotton | |
|---|---|---|---|---|
| | K/S | RFL | K/S | RFL |
| Black | 332.8051 | 0.881 | 531.4529 | 0.627 |
| Blue | 297.8924 | 1.714 | 436.0327 | 0.991 |
| Green | 111.9366 | 2.620 | 167.7104 | 1.347 |
| Red | 312.6870 | 1.440 | 483.5266 | 0.806 |
| Yellow | 199.1672 | 1.390 | 331.5611 | 0.724 |

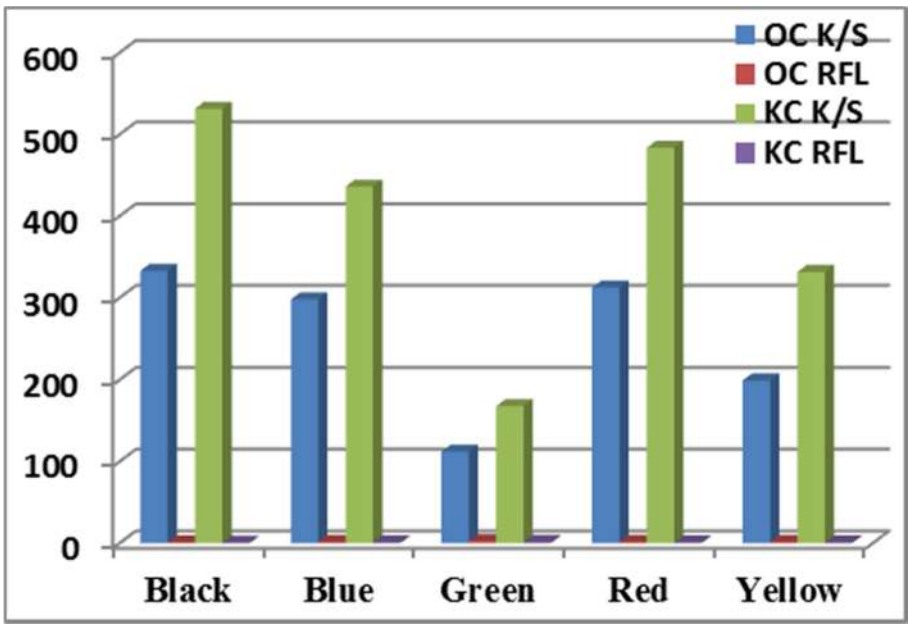


**Fig 1a. Colour strength (K/S) and Reflectance (RFL) values of reactive printed, <u>urea</u> treated organic and khadi cotton samples**

**Table 1b.**

**Colour coordinate (∆Lab) and colour difference (∆E) values of reactive printed, Urea treated organic and khadi cotton samples**

| Colour | Organic Cotton | | | | Khadhi Cotton | | | |
|---|---|---|---|---|---|---|---|---|
| | ΔL | Δa | Δb | ΔE | ΔL | Δa | Δb | ΔE |
| Black | 0.174 | -0.067 | -2.645 | 2.652 | -0.165 | 0.049 | 2.343 | 2.349 |
| Blue | -0.706 | 0.926 | 0.329 | 1.210 | 0.698 | -0.870 | -0.365 | 1.174 |
| Green | -0.971 | 2.464 | -6.013 | 6.570 | 0.944 | -2.427 | 5.663 | 6.233 |
| Red | 0.633 | 4.320 | -4.520 | 6.284 | -0.620 | -4.784 | 3.992 | 5.631 |
| Yellow | 6.991 | -0.987 | 10.372 | 12.547 | -8.239 | 0.664 | -12.483 | 14.972 |

**ΔL**- Lightness/darkness (+/-) than standard **Δa** - Coordinate axis [+a - red, -a - green]
**Δb** - Coordinate axis [ +b - yellow, -b- blue] **ΔE** - Total colour difference

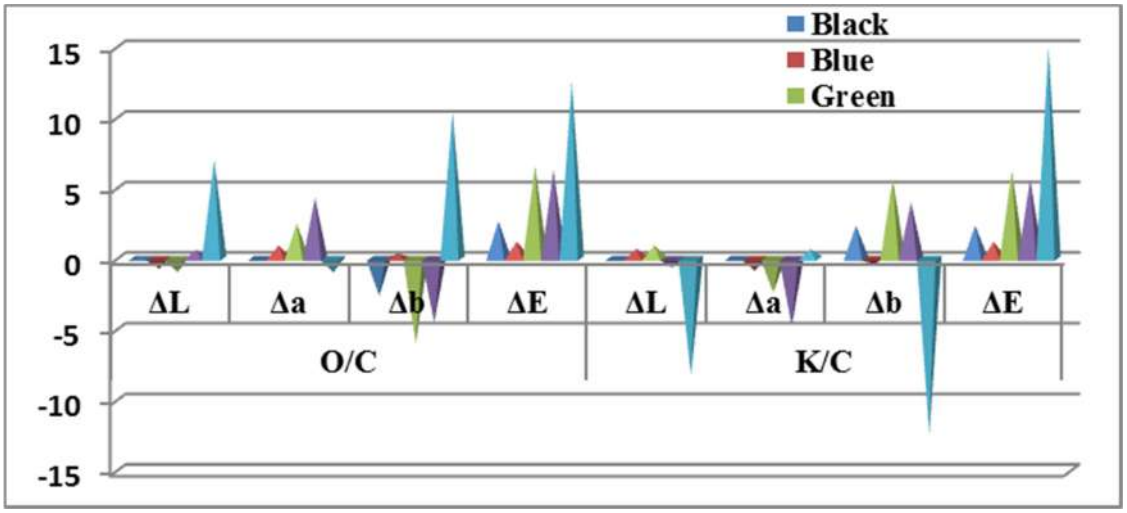


**Fig1b. Colour coordinate (∆Lab) and colour difference (∆E) values of reactive printed, Urea treated organic and khadi cotton samples**

Increase in colour strength was (Table 2a) seen in Green OC and Blue KC samples treated with Sodium Acetate followed by Black OC Green KC. Red OC and Yellow KC samples exhibited (Table 2a) higher Reflectance (RFL) values (3.923 & 3.741) followed by Black OC and KC (2.342 & 2.517) respectively. Sodium Acetate treated Yellow OC and KC samples (Table2b) indicated (Table 2b) maximum colour difference (ΔE-13.437 & 42.275) value followed by red (ΔE-6.125 &10.046) may be because of breaking of double bond and molecular rearrangement resulting in colour change and hence the maximum colour difference.

**Table 2a.**

**Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Acetate treated organic and khadi cotton samples**

| Colour | Organic Cotton | | Khadhi Cotton | |
|---|---|---|---|---|
| | K/S | RFL | K/S | RFL |
| Black | 258.5188 | 2.342 | 249.5132 | 2.517 |
| Blue | 230.3920 | 1.183 | 556.8892 | 0.473 |
| Green | 320.1537 | 1.044 | 297.7540 | 1.043 |
| Red | 124.6321 | 3.923 | 273.2122 | 1.749 |
| Yellow | 85.4940 | 3.186 | 64.4876 | 3.741 |

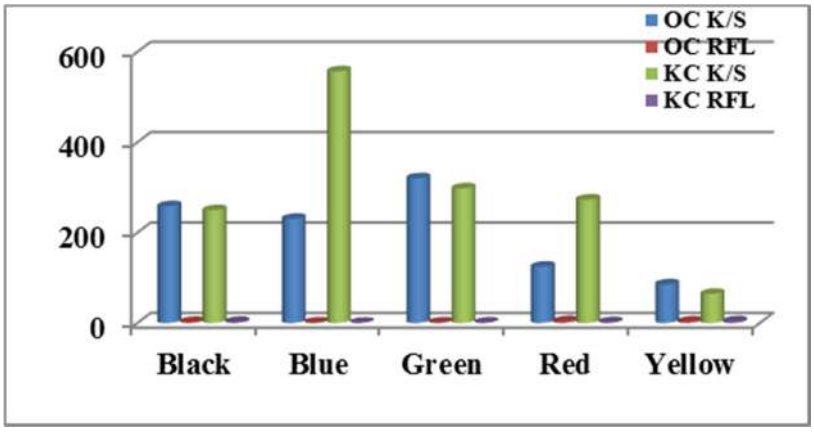


**Fig 2a. Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Acetate treated organic and khadi cotton samples**

**Table 2b.**

**Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Sodium Acetate treated organic and khadi cotton samples**

| Colour | Organic Cotton | | | | Khadhi Cotton | | | |
|---|---|---|---|---|---|---|---|---|
| | ΔL | Δa | Δb | **ΔE** | ΔL | Δa | Δb | **ΔE** |
| Black | 0.004 | 0.001 | 1.321 | 1.321 | -0.095 | -0.080 | 5.552 | 5.553 |
| Blue | -0.922 | 0.124 | 2.079 | 2.278 | 2.623 | -2.563 | -0.136 | 3.670 |
| Green | 1.904 | -5.110 | 1.381 | 5.625 | 0.803 | -1.796 | 5.408 | 5.755 |
| Red | -0.918 | -6.048 | 0.310 | 6.125 | -1.597 | -9.068 | 4.017 | 10.046 |
| Yellow | -6.817 | 3.110 | -11.154 | 13.437 | -22.644 | 7.738 | -34.850 | 42.275 |

**ΔL**- Lightness/darkness (+/-) than standard
**Δa** - Coordinate axis [+a - red, -a - green]
**Δb** - Coordinate axis [ +b - yellow, -b- blue]
**ΔE** - Total colour difference

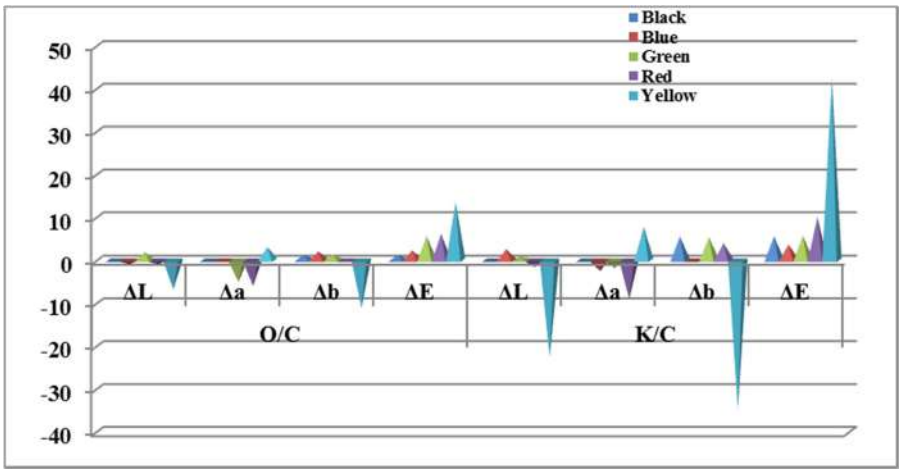


**Fig 2b. Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Sodium Acetate treated organic and khadi cotton samples**

Black attained (Table 3a) highest colour strength (K/S) values both in OC and KC (351.3403 &440.6161) samples treated with Sodium Formate, which may be because of Black is a vinyl sulphone type of reactive dye results in low reduction of colour yield. Yellow OC and KC samples treated with Sodium Formate depicted (Table 3b) higher colour difference (ΔE - 9.581 & 27.498) values followed by Green OC and Blue KC (ΔE - 7.451 &8.526) samples.

**Table 3a.**

**Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Formate treated organic and khadi cotton samples**

| Colour | Organic Cotton | | Khadhi Cotton | |
|---|---|---|---|---|
| | K/S | RFL | K/S | RFL |
| Black | 351.3403 | 1.773 | 440.6161 | 1.375 |
| Blue | 257.4379 | **1.074** | 210.8716 | 1.523 |
| Green | 266.7195 | 1.087 | 134.2498 | 2.018 |
| Red | 243.3004 | 1.770 | 413.8322 | 1.095 |
| Yellow | 90.3379 | 3.178 | 84.6479 | 3.107 |

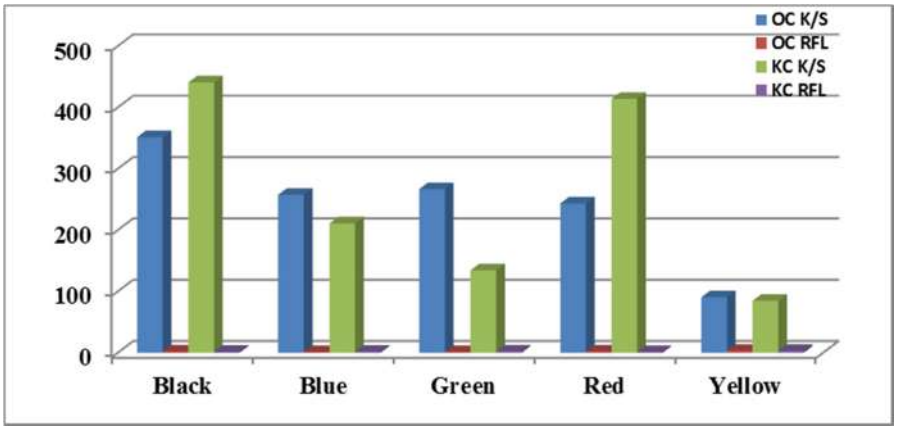


**Fig 3a. Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Formate treated organic and khadi cotton samples**

**Table 3b.**

**Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Sodium Formate treated organic and khadi cotton samples**

| Colour | O/C | | | | K/C | | | |
|---|---|---|---|---|---|---|---|---|
| | ΔL | Δa | Δb | **ΔE** | ΔL | Δa | Δb | **ΔE** |
| Black | 0.047 | -0.182 | 2.822 | 2.828 | 0.012 | -0.572 | 4.683 | 4.718 |
| Blue | -1.156 | 0.762 | 1.310 | **1.906** | -5.164 | 4.683 | 4.909 | **8.526** |
| Green | 2.112 | -6.208 | -3.538 | **7.451** | -1.161 | 3.149 | 1.048 | **3.516** |
| Red | 0.759 | 2.942 | -0.279 | 3.051 | -1.216 | -6.628 | 4.842 | 8.298 |
| Yellow | -5.189 | 0.537 | -8.036 | **9.581** | -14.980 | 4.196 | -22.674 | **27.498** |

**ΔL**- Lightness/darkness (+/-) than standard **Δa** - Coordinate axis [+a - red, -a - green]
**Δb** - Coordinate axis [ +b - yellow, -b- blue] **ΔE** - Total colour difference

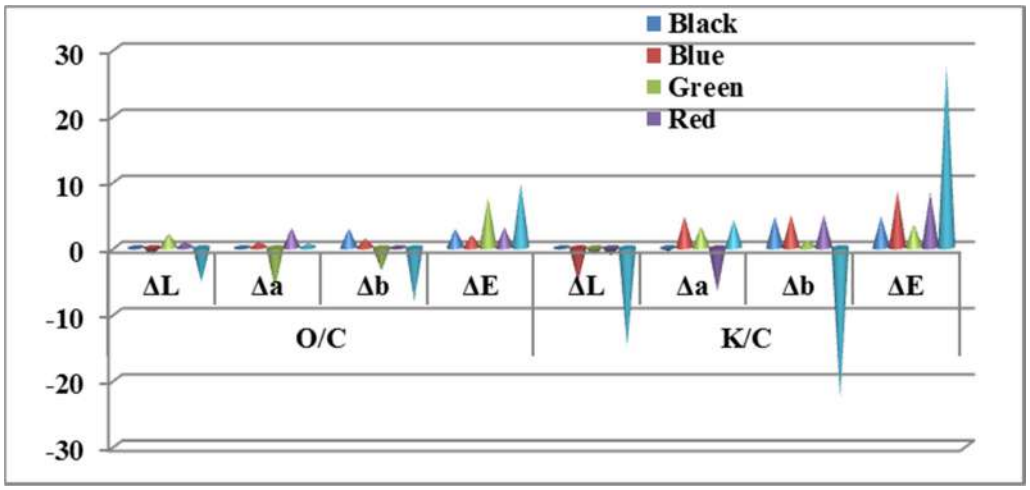


**Fig 3b. Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Sodium Formate treated organic and khadi cotton samples**

Maximum colour strength (K/S) was seen (Table 4a) in Sodium Editate treated Red OC (344.4107)and Black KC (423.6336)samples followed by Black OC (336.2522) and Blue KC(225.0867). A high pH actually activates the cellulose fibre, forming a cellulose anion,which can then attack the dye molecule,leading to a reaction that produces a strong,permanent covalent bond.Sodium carbonate is used in the dye paste as one of the ingredient to increase the pH of the dye reaction. Total colour difference was seen highest (Table 4b) in Sodium Editate treated Blue OC and Yelow KC samples (ΔE - 10.527&14.006) followed by Green OC and KC (ΔE - 9.400 &12.555) samples.

**Table 4a.**

**Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Editate treated organic and khadi cotton samples**

| Colour | OC | | KC | |
|---|---|---|---|---|
| | K/S | RFL | K/S | RFL |
| Black | 336.2522 | 2.298 | 423.6336 | 1.374 |
| Blue | 193.8484 | 1.552 | 225.0867 | 1.396 |
| Green | 115.6020 | 3.259 | 105.2575 | 4.025 |
| Red | 344.4107 | 1.353 | 225.0519 | 1.763 |
| Yellow | 178.9060 | 1.743 | 195.2163 | 1.622 |

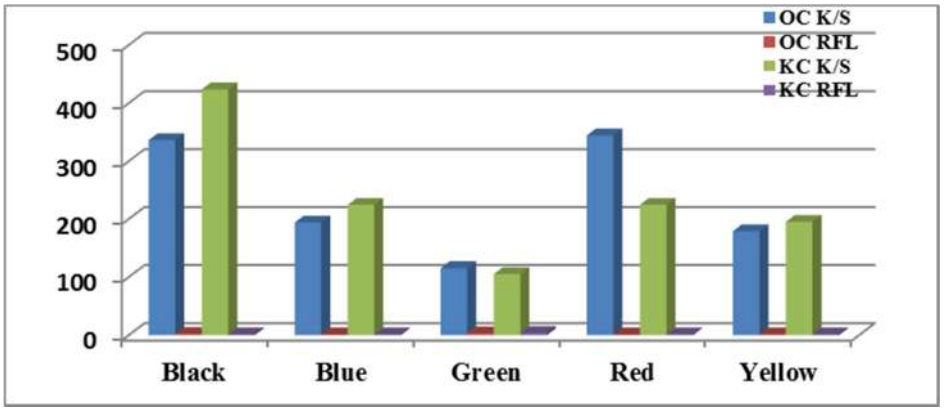


**Fig 4a. Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Sodium Editate treated organic and khadi cotton samples**

**Table 4b.**

**Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Sodium Editate treated organic and khadi cotton samples**

| Colour | O/C | | | | K/C | | | |
|---|---|---|---|---|---|---|---|---|
| | ΔL | Δa | Δb | **ΔE** | ΔL | Δa | Δb | **ΔE** |
| Black | 1.107 | -2.241 | 1.650 | 2.995 | -0.070 | -0.218 | 3.357 | 3.365 |
| Blue | -4.963 | 0.475 | 9.271 | 10.527 | -4.116 | 3.007 | 4.364 | 6.710 |
| Green | 0.941 | 2.929 | 8.882 | 9.400 | 0.965 | 2.381 | 12.289 | 12.555 |
| Red | 0.301 | 0.649 | 1.574 | 1.729 | 1.002 | 2.268 | 6.048 | 6.537 |
| Yellow | -0.090 | -1.741 | 0.401 | 1.789 | -7.814 | -0.846 | -11.593 | 14.006 |

**ΔL**- Lightness/darkness (+/-) than standard
**Δb** - Coordinate axis [ +b - yellow, -b- blue]
**Δa** - Coordinate axis [+a - red, -a - green]
**ΔE** - Total colour difference

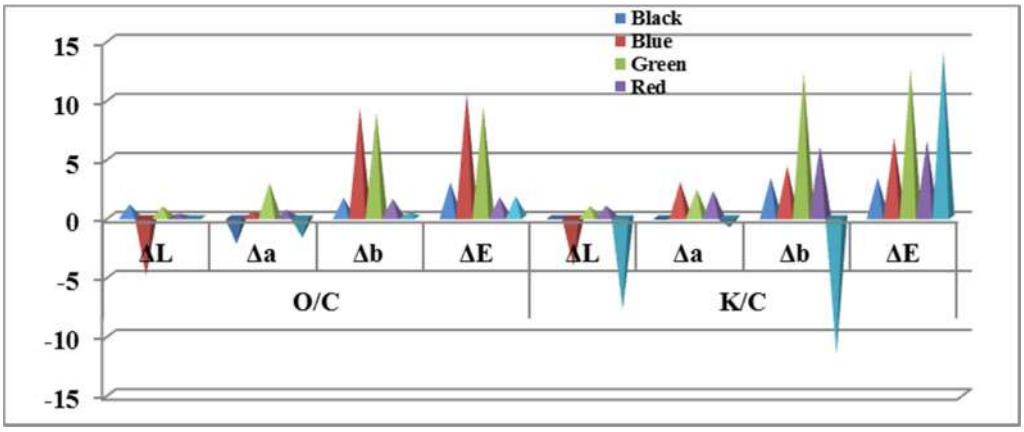


**Fig4b. Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed,Sodium Editate treated organic and khadi cotton samples**

Black attained (Table 5a) highest colour strength (K/S)values both in OC and KC (385.2854& 395.6286) samples treated with Tri sodium Citrate followed by Red OC and KC (224.9509& 308.1982). Tri Sodium Citrate treated (Table 5b) Blue OC and Yellow KC samples indicated maximum Total colour difference (ΔE - 13.465 &24.840) values followed by Yellow OC and Blue KC (ΔE-9.798& 12.962) respectively.

**Table 5a.**

**Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Tri Sodium Citrate treated organic and khadi cotton samples**

| Colour | OC | | KC | |
|---|---|---|---|---|
| | K/S | RFL | K/S | RFL |
| Black | 385.2854 | 1.710 | 395.6286 | 1.593 |
| Blue | 179.4180 | 1.973 | 169.8739 | 1.950 |
| Green | 138.1519 | 2.838 | 105.3188 | 3.980 |
| Red | 224.9509 | 2.113 | 308.1982 | 1.530 |
| Yellow | 89.7870 | 3.194 | 113.3335 | 2.483 |

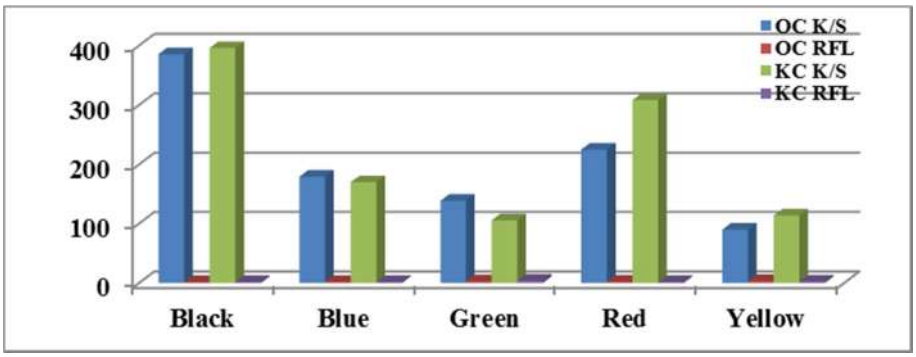


**Fig 5a. Colour strength (K/S) and Reflectance (RFL) values of reactive printed, Tri Sodium Citrate treated organic and khadi cotton samples**

**Table 5b.**

**Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Tri Sodium Citrate treated organic and khadi cotton samples**

| Colour | O/C | | | | K/C | | | |
|---|---|---|---|---|---|---|---|---|
| | ΔL | Δa | Δb | **ΔE** | ΔL | Δa | Δb | **ΔE** |
| Black | -0.133 | 1.108 | 3.234 | 3.421 | -0.191 | 0.620 | 5.239 | **5.279** |
| Blue | -7.478 | 4.866 | 10.085 | **13.465** | -7.239 | 6.158 | 8.814 | **12.962** |
| Green | -1.503 | 6.570 | 2.421 | 7.161 | -1.679 | 8.605 | 7.051 | 11.251 |
| Red | -0.231 | -2.420 | 1.210 | **2.715** | -1.300 | -6.941 | 4.119 | 8.175 |
| Yellow | -5.296 | 0.176 | -8.242 | **9.798** | -13.679 | 4.389 | -20.264 | **24.840** |

**ΔL**- Lightness/darkness (+/-) than standard
**Δb** - Coordinate axis [ +b - yellow, -b- blue]
**Δa** - Coordinate axis [+a - red, -a - green]
**ΔE** - Total colour difference

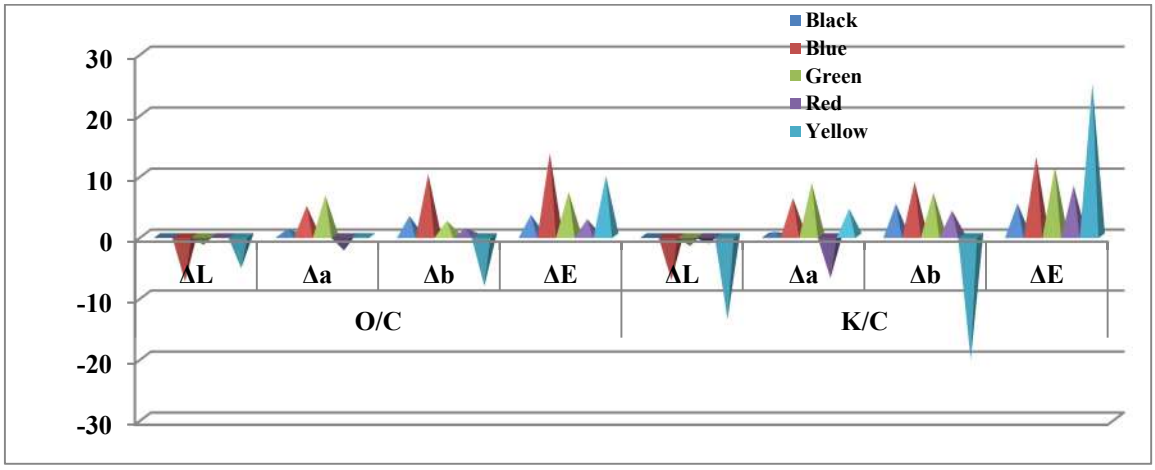


**Fig 5b. Colour coordinate (ΔLab) and colour difference (ΔE) values of reactive printed, Tri Sodium Citrate treated organic and khadi cotton samples**

**Table 6.**

**Summarised values of Colour Strength of treated organic and khadi cotton samples**

| Colour | Colour strength (K/S)values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Urea | | Sodium Acetate | | Sodium Formate | | Sodium Editate | | Tri Sodium Citrate | |
| | OC | KC | OC | KC | OC | KC | OC | KC | OC | KC |
| Black | 332.8051 | 531.4529 | 258.5188 | 249.5132 | 351.3403 | 440.6161 | 336.2522 | 423.6336 | 385.2854 | 395.6286 |
| Blue | 297.8924 | 436.0327 | 230.3920 | 556.8892 | 257.4379 | 210.8716 | 193.8484 | 225.0867 | 179.4180 | 169.8739 |
| Green | 111.9366 | 167.7104 | 320.1537 | 297.7540 | 266.7195 | 134.2498 | 115.6020 | 105.2575 | 138.1519 | 105.3188 |
| Red | 312.6870 | 483.5266 | 124.6321 | 273.2122 | 243.3004 | 413.8322 | 344.4107 | 225.0519 | 224.9509 | 308.1982 |
| Yellow | 199.1672 | 331.5611 | 85.4940 | 64.4876 | 90.3379 | 84.6479 | 178.9060 | 195.2163 | 89.7870 | 113.3335 |

Irrespective of alkalies substituted with urea, all (Table 6) selected Reactive dyes exhibited good Stability and colour strength. Yellow color depicted lower values of colour strength treated with Sodium Acetate and Sodium Formate. Whereas Black colour attained greater values of colour strength for all alkalies substituted with urea.hence elimination or replacement of urea in cellulose printing can be done.

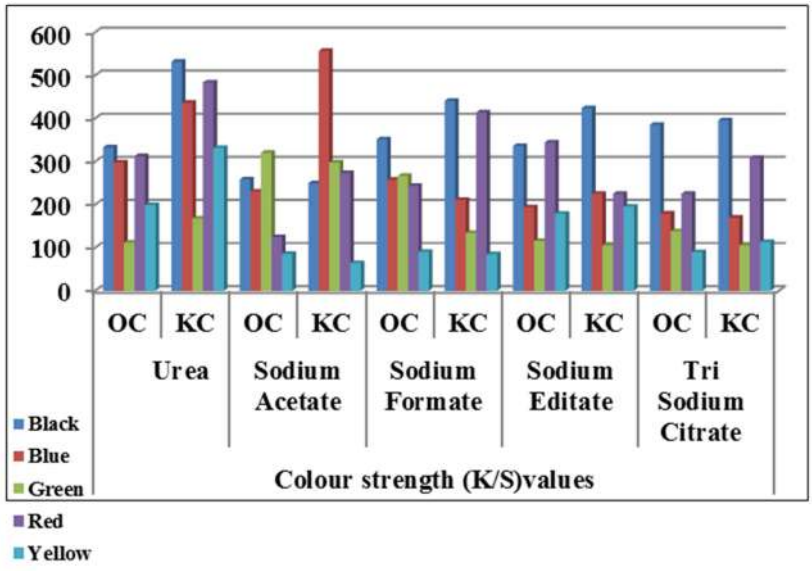


**Fig 6. Summarised values of Colour Strength of treated organic and khadi cotton samples**

**Cost Estimation of printing (per meter)**

**Table 7.**

**Cost Estimation of printing (per meter)**

| Sl no | Materials | Qty | Rate/Unit Rs | Amount Rs |
|---|---|---|---|---|
| 1 | Colour | 0.5g | 480/kg | 0.24 |
| 2 | Water | 10ml | - | - |
| 3 | Urea and alkalies | 2.5g | 370/kg | 0.92 |
| 4 | Resist salt-L | 0.8g | 220/kg | 0.18 |
| 5 | Sodium alginate | 1.25g | 300/kg | 0.38 |
| 6 | Sodium carbonate | 0.5g | 310/kg | 0.16 |
| 7 | Electricity | 5 min | 2.70/unit/hr | 0.12 |
| 8 | Labour charge | One meter | 5/meter | 5.00 |
| 9 | Cotton material | One meter | 80/meter | 80.00 |
| | **Total** | | | **87.00** |

**Conclusion**

- Use of an environmentally-safe and non-toxic biodegradable organic salt, as a substitute for urea in the reactive dye print pastes and are viable for dye-fibre fixation. Loss of colour strength was maximum in Black. Higher the colour strength lower the reflectance value which indicates the reflection angle of incident light.
- Use of an environmentally-safe and non-toxic biodegradable organic salt,as a substitute for urea in the reactive dye print pastes and are viable for dye-fibre fixation. Loss of colour strength was maximum in Black. It is clear that the average colour differences (**Δ** E), calculated from the CIE *L*a*b** coordinates) of the printed fabrics showed good levelling properties in all cases.
- The result indicates that organic salts/ alkali printing shows the best results compared with urea/alkali conventional printing. Besides the low cost of organic salts and its use in printing of cotton with reactive dyes, the prints obtained have good levelness, outline sharpness, low penetration with considerable dyestuff savings and thus low demands on the print back cloth washing process leading to a reduction of the wastewater load. This work is a step forward for cleaner production within the textile industry.
- Because of the high nitrogen concentration in urea, it is very important to achieve an even spread. is an organic compound with the chemical formula $CO(NH_2)_2$. The molecule has two — $NH_2$ groups joined by acarbonyl (C=O) functional group. Urea absorbs moisture from the atmosphere and therefore is typically stored either in closed or sealed bags on pallets. Urea can be irritating to skin, eyes, and the respiratory tract. Repeated or prolonged contact with urea on the skin may cause dermatitis. Urea can cause algal blooms to produce toxins.
- Textile and Apparel Industry due to the characteristics of quick response solve environmental problems. The quality reaches with Water & Energy-saving features in a more prominent way. The viability of using an alternative to urea in reactive dye print pastes for cotton materials can be explored. Eco-printing of cotton with reactive dyes, the prints obtained have good shade depth, print quality with considerable dyestuff savings and thus eliminates the print effluents. Leading to a reduction of the wastewater load. A step forward for cleaner production technology within the textile industry.

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## *ДИЗАЙН / DESIGN*

# ТВОРЧЕСТВОТО ЗА РАЗВИТИЕ И ПОНЯТИЯА В ПРОМИШЛЕН ДИЗАЙН

**Vaska Sandeva, Katerina Despot**

***Абстракт***: F.C. Asfort Дизајнот се дефинира како активност која има за цел да го обликува производот на таков начин што е полесно и поекономично да произведува, всушност достапно знаење и опрема за да има корист од најефикасниот начин. Дизајнот придонесува за подобар живот и подобри естетски и ергономски квалитети.

Дизајнот и креативноста имаат некои заеднички работи, но тие не се исто. Раните фази на креативноста се карактеризираат со постоење на доста нејасни идеи, многу различни димензии, толеранција на несигурност и употреба на интуиција. Исто така, постои потреба за експериментирање и повторување или повторно размислување. Во раните фази на дизајнирање идеи, многу брз начин е да се создаде силен концепт или заедничка визија која се тестира надвор од реализацијата. Доцните фази на креативноста се повеќе точни и јасни идеи, тенденција за конвергентно размислување, поголема употреба на анализите и грижа за тестовите кои докажуваат конзистентност. Доцните фази на дизајнот се движат во можности за размислување за прашања како што се производство и пазар. Можеме да видиме дека раните фази на дизајнот вклучуваат фази на креативност, а подоцна фазите на дизајнот вклучуваат само подоцнежни фази на креативност.

Современиот дизајн на ентериер е човечки начин за усвојување технолошка сфера за да се прилагоди на способностите и барањата на човечките односи и

# CREATIVITY DEVELOPMENT CONCEPT IN INDUSTRIAL DESIGN

**Vaska Sandeva, Katerina Despot**

***Abstract***: F.C. Asfort determines the design as an activity which aims to shape the product in such a way it is easier and more economical to produce actually available knowledge and equipment to be used in the most effective manner. The design contributes to a better life and improves the aesthetic and ergonomic qualities.

Design and creativity have certain things in common, but they are not the same thing. In the early stages of creativity are characterized by the existence of implicit rather vague ideas, many divergent opinions, tolerance of ambiguity and the use of intuition. There is also a need for experimentation and repetition or re-thinking. In the early stages of design ideas quite quickly given way to create a strong common vision or concept being tested out for conversion. Later phases of creativity are more precise and clear ideas, a tendency to convergent thinking, a greater use of analysis and care tests proving consistency. Later phases of design moved to considerations of competence on issues such as production and market. We can see that the early stages of design include stages of creativity, while later stages of the design include only later stages in creativity.

The contemporary design in its deep interior is typical human way for the adoption of techno sphere to adapt to the

поединците.

***Клучни зборови*:** дизајн, концепт, идеја, решение

**Креативност**

Значајна карактеристика на уметникот е креативната флексибилност, која му дозволува да работи интуитивно со елементите и принципите како со груб материјал.

Кога ќе разбереме дека целиот свет на дизајнот, архитектурата, сликарството, скулптурата, модата, индустрискиот и комерцијалниот дизајн и сите негови гранки се базирани на овие шест елементи, тогаш можеме само да се воодушевуваме на варијациите кои се достигнати.

opportunities and demands of human relations and individuals.

***Keywords***: design, concept, idea, solution

**Creativity**

The creative characteristic of the artist is the creative flexibility, which allows him to work intuitively with the elements and principles as with a rough material.

When we understand that the whole world of design, architecture, painting, sculpture, fashion, industrial and commercial design and all its branches are based on these six elements, then we can only admire the variations that have been reached.

**Слика 1. Креативни концепри во индустрискиот дизајн**

**Fig 1. Creativity development concept in industrial design**

Независно колку различни видови на дизајнерски производи се креирани со употребата на овие шест или неколку едноставни елементи, може да се извлече само еден заклучок: Уметникот е само потенцијален дел од своето дело, така да ниту неговиот асистент или ученик, колку и да е добро обучен не може да ги постигне истите резултати како тој самиот. Постојат многу видови на уметнички дела, слики работени во работилниците на старите мајстори во кои дури ни експертите не

Regardless of how many different types of design products are created using the use of these six or a few simple elements, one conclusion can be drawn: The artist is only a potential part of his work, so that neither his assistant or student, no matter how well trained Can not achieve the same results as himself. There are many types of works of art, paintings made in the workshops of the old masters in which even the

можат да ги забележат разликите во делата, односно кои дела се работени од помошниците а кои од раката на самиот мајстор.

Тоа се случува и тогаш кога мајсторот им давал конкретни и директни инструкции како треба нешто да се изработи.

За еден уметник е потребна инспирација за работа во студио со други уметници, за да може да се забележат нивните различни пристапи и различни точки на гледање преку еден субјект или модел.

На пример, претставувањето на некое дело од одреден уметнички стил и упатувањето на учениците да го насликаат, покажува дека ниту две завршени слики не се сосема слични.

Дури и така едноставен предмет како што е портокал може да биде насликан во различни бои и величини зависно од гледиштето на оној кој го набљудува.

Типот на избраната композиција и истакнатите места на поставување на различните елементи всушност претставуваат клуч за откривање на личноста на уметникот. Ова остварување го обврзува уметникот да го гради својот вкус и познавање до максимум, бидејќи неговото дело не само што ја рефлектира социјалната и духовната клима на неговото време, туку истовремено го открива и него самиот во недопирливиот квалитет на неговата уметност. Неговите уметнички вештини откриваат кој е тој самиот: личност која поседува мајсторска техника чие користење не е цел сама за себе, туку потреба да му каже нешто на светот.

Креативноста е одлика само на

experts can not notice the differences in the works, that is, which works are done by the aides and which are from the hand of the master himself.

This happens even when the master gave them specific and direct instructions on how to do something.

An artist needs inspiration to work in a studio with other artists, so that their different approaches and different viewing points through one subject or model can be noticed.

For example, the presentation of a piece of art from a certain artistic style and a reference to students to paint it shows that no two finished pictures are completely similar.

Even a simple object such as orange can be painted in different colors and sizes depending on the viewer's vision.

The type of the selected composition and the distinguished places of placement of the various elements are actually the key to revealing the personality of the artist. This accomplishment obliges the artist to build his own taste and knowledge to the maximum, because his work not only reflects the social and spiritual climate of his time, but also reveals himself in the untouchable quality of his art. His artistic skills reveal who he himself is: a person who possesses a master technique whose use is not an end in itself, but a need to say something to the world.

Creativity is a feature of only the human mind. No machine, no

човековиот ум. Ниедна машина, ниеден компјутер не може да ви го долови ова чувство на убавина, на исполнетост, на позитивни мисли. Креативноста е одлика само на човекот. Мудрите луѓе никогаш не престануваат да размислуваат.

Да се биде креативен не е лесно. Да се стекне знаење е многу полесно отколку да се биде креативен. Креативноста не се учи, туку едноставно се спроведува и излегува од самиот претприемач.

Креативноста значи:

- Сонување за нешто ново или за подобрување на работите околу нас
- Замислување на подобри работи, нешто сосема ново за околината
- Откривање на можности за подобрување на нешто, сеуште непостоечко
- Размислување за нешто ново, за подобрување на работите околу нас

computer can capture this feeling of beauty, of fullness, of positive thoughts. Creativity is only a human being. The wise men never stop thinking.

Being creative is not easy. To gain knowledge is much easier than being creative. Creativity is not taught, but simply implemented and exited by the entrepreneur himself.

Creativity means:

- Dreaming about something new or improving things around us
- Thinking of better things, something completely new to the environment
- Discovering opportunities to improve something that is not yet existing
- Thinking about something new, to improve things around us

**Слика 2. Креативни концепри во индустрискиот дизајн**

**Fig 2. Industrial design interior**

## Разлика помеѓу кретаивност и иновација

Креативноста е ментален и социјален процес кој вклучува генерирање на нови идеи, или креативно комбинирање помеѓу постоечки идеи и концепти, односно креативноста е чин на содавање

## Difference between creativity and innovation

Creativity is a mental and social process that involves generating new ideas, or creatively combining existing ideas and concepts, that is, creativity is an act of creating something new.

нешто ново.Постои разлика меѓу креативноста и иновацијата. Ако креативноста е чин на создавање нови идеи, концепти, акции, иновацијата е процесот на генерирање и воведување во пракса на тие креативни идеи.

Поради тоа, често во компаниите терминот иновација се однесува на целиот процес на генерирање креативни идеи и конвертирање во корисни, видливи резултати, а креативноста само како генерирање на нови идеи од страна на индивидуалци или групи, како потребен чекор во процесот на иновација.

There is a difference between creativity and innovation. If creativity is an act of creating new ideas, concepts, actions, innovation is the process of generating and introducing into practice those creative ideas.

Therefore, often in companies, the term innovation refers to the whole process of generating creative ideas and converting it into useful, visible results, and creativity just as generating new ideas by individuals or groups as a necessary step in the process of innovation.


**Слика 3. Креативни концепри во индустрискиот дизајн**

**Fig 3. Creativity development concept in industrial design**

## Дали постои дефиниција за креативност?

"Не постои една дефиниција. Затоа, ние целата работа ја гледаме

## Is there a definition of creativity?

"There is no one definition, so we see the whole thing problematic, so there is a possibility for debate and

проблематично затоа постои е можност за дебата и анализа од различни аспекти. Има луѓе кои инсистираат на тоа дека постои креативен производ кој е ценет од страна на експерти како креативен, но постојат и луѓе кои велат дека постои процес што е многу важно, а луѓето кои велат дека креативноста е индивидуална.

Мнозинството на поединци имаат способност да бидат креативни и како последица имаат придонес во дизајн процеси. Но, тоа е вредно да се запамети дека разлики во стилови на мислење може да влијае каде што некој може да даде придонес.

Постојат две широки групи на параметри во стилови на мислење, предност за факти, историја и искуство, или, предност за метафора, слики и интуиција. Луѓе за кои првиот сет е подобро се чувствуваат поудобно со аспекти на експлицитни знаење во мерење, контрола, процеси и специфи-кации. Луѓе кои се привлечени од вториот сет се чувствуваат поудобно со имплицитна или премолчена знаење во дискурсот, идеи, двосмисленост и појава.

analysis from different aspects. There are people who insist that there is a creative product that is valued by experts as creative, but there are people Who say there is a process that is very important, and people who say that creativity is individual.

The majority of individuals have the ability to be creative and as a consequence have a contribution to design processes. But it is worth remembering that differences in opinion styles can affect where one can make a contribution.

There are two broad sets of parameters in style of thinking, an advantage for facts, history and experience, or an advantage for metaphor, imagery and intuition. People whose first set is better feel more comfortable with aspects of explicit knowledge in measurement, control, processes, and specifications. People who are attracted to the second set feel more comfortable with implicit or tacit knowledge in discourse, ideas, ambiguity, and phenomenon.

**Слика 4. Трансформација на природна форма во функционална индустриска форма**

**Fig. 4 Trensformation natural form functional industrial form**

Дизајнерската активност е една од карактеристичните и истовремено најшироко распространетите проучувања на пластична креативност во материјалното производство на 20ти век.

Designer activity is one of the characteristic and at the same time the most widespread studies of plastic creativity in 20th-century material production.

**Слика 5. Индустриска форма**

**Fig. 5. Industrial form**

Специфичноста и е да гради лик на индустриската продукција, вклучувајќи естетска изразност и информатичката читливост на предметната средина. Тоа ја поставува дизајнерската креативност во дијалектната зависност од основниот начин на производство на материјални блага во епохата на научно-техничката револуција.

Своевремено општеството на дизајнот како пластично творештво во не помал степен ја владее човечката дејност со илјадниците мисли на човекот да го осмисли и претвори светот во кој живее во

The specificity is to build a character of industrial production, including aesthetic expression and information readability of the subject environment. It sets the designer's creativity in dialect dependence on the basic way of producing material goods in the epoch of the scientific and technical revolution.

At the same time, the society of design as a plastic creation, to a lesser degree governs human activity with the thousands of thoughts of

подобро дизајнирано место за разбирање и убавина.

Таа дејност или поточно дијалектната противречна природа на дизајнот дава одраз на врвот на сите негови манифестации.

Внатрешно противречната природа на дизајнерското творештво налага отпечаток врз крајниот дизајнерски продукт, претворајќи го во чувствителен показател за технолошкото развивање на материјалното производство, во критериум за степенот на културното општество на техниката од страна на човекот. По тој начин, дизајнот се прима од милиони луѓе како обврзен симбол за културата на човечките општества во современиот свет.

Врската меѓу народните занаети и дизајнот може да се открие ако внимателно се разгледуваат и занаетите и дизајнот.

Не само што сакаме да ја откриеме дизајнерската дејност во нас, туку и да ги запознаеме законитостите по кои работи таа дизајнерска дејност. Навистина се уште сме во време кое дава можност за објективна проценка на науката и практиката. Тој факт сам по себе си влегува во областа на дизајнот и на формирањето како негова срцевина.

Ни преостанува можноста за изучување на богатото и своевремено непрекинато дизајнерско тло, исто така имаме можност да го проследиме формирањето и развивањето на една потребна творечка дејност.

Фактот дека сме современи и современо учествуваме во некои од разностраните појави на дизајнерската дејност е нова карактеристика на проучувањето на работата.

man to conceive and turn the world in which he lives in a better designed place of understanding and beauty.

This activity or more precisely the dialectic contradictory nature of the design reflects the top of all its manifestations.

The internally contradictory nature of the designer's work requires a fingerprint on the ultimate design product, turning it into a sensitive indicator for the technological development of material production, in a criterion for the extent of the cultural society of the technique by man. In this way, the design is received by millions of people as a compulsory symbol of the culture of human societies in the modern world.

The relationship between folk crafts and design can be detected if carefully crafted and crafted designs.

Not only do we want to discover the design activity in us, but also to get acquainted with the legalities in which this design activity works. We are really still in a time that provides an opportunity for an objective assessment of science and practice. That fact itself enters the field of design and formation as its core.

We do not have the opportunity to study the rich and contemporary continuous design ground, we also have the opportunity to follow the formation and development of a necessary creative activity.

The fact that we are modern and contemporary in some of the diverse phenomena of the design activity is a

Постои квалитетна разлика помеѓу традиционалната научна дејност и ново излезената дизајнерска дејност. Пред очите ни се отвора општа потреба за научно објаснување на сопствената практика за дизајнерската практична дејност.

Секое поколение си дава свои измени на претходните знаења за дизајнот и така самиот дизајн се менува. Своевремено сме должни да поднесеме прилично лесни принципи на подобар пат и на преценување. Историјата на дизајнот е пред сите процеси во кои е можно да се вклучиме само ако сме владетели на неопходниот степен на изменување на дизајнот.

Појавата на стереотипи и во таа смисла обогатувањето на традицијата и нејзиното развивање се неопходни и тоа е главниот услов за појавувањето и утврдувањето на еден артистички факт. Прашањето е од позициите на современото научно значење и од условите кои се поставени од естетичкото творештво.

new feature of studying the work.

There is a quality difference between the traditional science activity and the newly outsourced design activity. Before our eyes, we open a general need for a scientific explanation of our own practice for the design practical work.

Each generation makes its own changes to the previous knowledge of the design and thus the design itself changes. At the time we are obliged to submit fairly light principles on a better way and an overestimation.

The emergence of stereotypes and in that sense the enrichment of tradition and its development are necessary and that is the main condition for the emergence and establishment of an artistic fact. The question is from the positions of contemporary scientific significance and from the conditions posed by aesthetic creation.


**Слика 6. Функционална индустриска форма**

**Fig 5. Creativity development concept in industrial design**

**Изводи**:

Главна цел е да се постигне добро балансиран процес за индустрискиот дизајн од сите аспекти односно форма – функција – форма поткрепени со изразена креативност.

Креативноста кај дизајнерот е поврзана со многу аспекти: потеклото, изворите на инспирација, созреаната мисла за дизајн решение и спремноста за експеримент.

Јавната критика еден од главните фактори за креативност во индустрискиот дизајн.

Следноиот чекор која по кој треба да се движат дизајнерите е групната креативност.

**Conclusions**

The main goal is to achieve a well-balanced process for industrial design from all aspects, ie form - function - a form supported by strong creativity.

The creativity of the designer is related to many aspects: the origin, the sources of inspiration, the mature idea of the design solution and the readiness for experiment.

Public criticism is one of the main factors for creativity in industrial design.

The next step that designers need to move is group creativity.

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# КАРАКТЕРИСТИКИ НА АНТИЧКИОТ МЕБЕЛ ВО КОРЕЛАЦИЈА СО СКАНДИНАВСКИ МОДЕРНИЗАМ

**Katerina Despot, Vaska Sandeva**

***Краток извадок*:** Навлегување длабоко во историјата на антиката, со што подоцна подобро ќе ги дознаеме причините и инспирациите кои тогашните мајстори ги црпеле. Проучување на архитектурата и мебелот кој се користел во тоа време, од што бил изработен, за кој специјално бил изработен и сл. Анализа на мебелот кој се користел во античкиот период.

Спецификата на античкиот мебел има едно обележје кое остава еден печат за постоењето и животот во тој период, тие функционални предмети се уште можат да се видат како дел од историјата како музејски експонати во ентериер. Карактеристики и стилски одлики на мебелот кој постоел и концептот по кој се развивал, потребите и причините. Актуелноста на скандинавскиот модернизам неговата примена, и што го определува Скандинавскиот модернизам,кој има карактеристики и детали на примена на античкиот мебел, но сепак претставува еден модерен стил, кој е инспириран од природата и природните материјали, едноставноста кои пленуваат со една нота на чистина и јасност во изразот. Местото на потекло, природата, материјалите и најповеќе боите кои се користат во определбата на стилот.

***Клучни зборови*:** мебел; концепт;форма, дизајн, историја, стил

# CHARACTERISTICS OF ANCIENT FURNITURE CORRELATED WITH SCANDINAVIAN MODERNISAM

**Katerina Despot, Vaska Sandeva**

***Abstract***: Penetrating deep into the history of antiquity, which later will better know the reasons and inspirations that then masters drew. Study of architecture and furniture which was used at that time, it was made from, which was specially made and so on. Analysis of the furniture which was used in ancient reference period. The specifics of the antique furniture has a feature that leaves a stamp on the existence and life in that period, they are still functional objects can be seen as a part of history as museum exhibits in the interior. Characteristics and features stylish furniture that existed and the concept by which developed, needs and causes. The relevance of Scandinavian modernism its application, and what determines the Scandinavian modernism, which has the features and details of the application of antique furniture, but still represents a modern style that is inspired by nature and natural materials, that enchanting simplicity with a note of clarity and clarity izrazot. Mestoto the origin, nature, materials and colors most used in the determination of style.

***Keywords***: furniture, concept, form, desig, history, style

Античкиот период со себе носи голем дел на значајни уметнички дела, кои претставуваат врвни висококомплекси архитектонски отстварувања. Се појавуваат историски знајчајни градби, склуптури, мебел и најразлични предмети и детали.

Пронајдените артефакти, сведочат за културата и уметноста на античките цивилизации.

Во времето на античкиот период на човековата историја, комплексните општества се развиле во многу делови на светот,и заради појавата на пишување и читање на документи, денес имаме нов вид на докази кои ни кажуваат многу за овие групи,нивните идеали и активности. Во античкиот период, комплексните и високодекоративни стуктури им биле наменети само на владетелите или ги величеле боговите, а сликите, скулптурите и другите предмети биле создадени со цел да исполнуваат различни функции.

Во овој период повеќето дела се изработувале по барање на патроните, но бидејќи историските докази се оскудни, во многу случаи не ги знаеме нивните имиња. Многу се документирани индивидуалноста и личниот стил на голем број уметници. Иако им се восхитувале на овие уметници, нивната професија се гледала како недостиг на филозофски и едукативни вредности на либералнта уметност.

**Античкиот период**

Античка Македонија се наоѓала во централниот дел на Балканскиот Полуостров,на север до најсеверната хеленска (старогрчка) област, односно

The antiquity period carries a big part of the significant art pieces that represent highly complex architectonic achievements. Certain historical buildings, sculptures, furniture and most versatile objects and details can be found.

The artefacts found, are mere representatives of the culture and art of the antique civilizations.

In the ancient period of the human history, complex societies have developed in many parts of the world and as a result of the written documents left, today we have proofs that certify a lot for these groups, their ideals and activities. In this period, the complex and highly decorative structures were intended only for the rulers or for worshiping gods, whereby the paintings, sculptures and other items were created to perform different functions.

In this period, most of the items were ordered by the patrons, but since the historical evidences are obscure, in many cases we don’t know their names. Although they were objects of worship by many artists, their profession was seen as a lack of philosophical and educational values of the liberal art.

**Antiquity period**

Ancient Macedonia was situated in the central part of the Balkan Peninsula, on the north bordering with the north Hellenic (Ancient Greek) area, i.e. Thessaly. The antique authors describe it as mountainous country with a large

Тесалија. Античките автори ја опишуваат како планинска земја со голем број реки, богати полиња, шуми и езера и со рудни богатства.

Во однос на религијата на античките Македонци, таа е малку изучувана. Нивната религија, како и најголем дел од античката македонска историја, се изучува како дел од историјата на Хелените, поради вкоренетото убедување дека античките Македонци биле Хелени. Хеленските имиња на божествата се толкуваат како резултат на хеленизацијата.

Пронајдените артефакти сведочат за изработката на гробни дарови, златни погребни маски, златни сандали, нараквици, накит, метални садови како и оружјето.

**Мебелот во античкиот период во Македонија**

Како увидовме од претходните истражувања за уметноста во Македонија во античкиот период,можеме да заклучиме дека таа била под постојано влијание, пред се на античка Грција, но и античката римска уметност.

Во однос на мебелот кој се користел во Македонија немаме конкретни сведоштва, но како резултат на влијанието на грчката и римската уметност, за кои постојат многу повеќе докази како едни од најзначајните антички уметности, ќе се обидеме да направиме една паралела и истражување на античкиот мебел.

number of rivers, rich fields, forests and lakes as well as mineral resources.

The religion of the antique Macedonians has been little explored. Their religion, as well as the biggest part of the Ancient Macedonian`s history, has been learned as part of the Hellenic history, because of the deeply rooted conviction that antique Macedonians were Hellenic. Hellenic names of deities are interpreted as a result of the Hellenization.

The discovered artifacts testifying to the preparation of the burial gifts, gold funerary masks, golden sandals, bracelets, jewelry, metal utensils and weapons.

**Furniture in the ancient period in Macedonia**

As we saw from the previous research on art in Macedonia in the ancient period, we can conclude that it was under the constant influence, primarily of ancient Greece and ancient Roman art.

In terms of furniture for use in Macedonia we have no concrete evidence, but due to the influence of Greek and Roman art, for which there are much more evidence as one of the most ancient arts, we will try to make a parallel research of ancient furniture.

**Слика 1. Антички мебел кај населението**

**Fig 1. Ancient furniture in Macedonia**

Еден од најавтентичните и карактеристичен македонски мебел од античкиот период, претставува триножјето, кое било присутно скоро во секој дом. Се изработувало од дрво и се карактеризира со леснотија во изработката. Исто така можеме да го сретнеме во различни варијанти, најчесто различна обработка на нозете.

Во однос на материјали за изработка на мебелот, најчеста била примената на природните материјали. Поконкретно дрвото. Тргнувајќи од мебелот за складирање, комоди и слично, па се до мебелот за седење и лежење основен материјал е дрвото.

Поради неговата лесна обработка и секако природна убавина, тоа најчесто се користело. Секако овде и примената на другите материјали како железото и неговите легури, детали на бронза, злато и др.

Во однос на материјали и видот на мебелот кој се користел секако зависело и од статусот на граѓаните. Посиромашните луѓе, луѓето во селата немале многу голем избор на материјали, па така кај нив најчеста е употребаната на дрвото и тоа грубо обработено дрво, негова основна

One of the most authentic and distinctive Macedonian antique period furniture, is the three-leg chair, which was present in almost every home. It was made of wood and is characterized by ease of preparation. Also, we can find it in different varieties, often in the different carvings of the legs.

Regarding the materials for the furniture-making, the most common was the application of natural materials. Specifically, wood. Starting from the furniture for storage, sideboards, etc., up to furniture for sitting and laying the basic material is wood.

Due to its easy handling and of course the natural beauty, it is commonly used. Other materials are also used, such as iron and its alloys, details of bronze, gold and others.

In terms of materials and type of furniture used of course it depends on the status of citizens. Poorer people, people in the villages had a very large selection of materials, so for them the most common is the use of wood and roughly processed

обработка за да се обезбеди функционалност и задоволување на основните потребни. Најчест мебел кај нив е мебелот за основно складирање, мебелот за седење и спиење.

Додека кај поимотните луѓе, во домовите во градовите, бил присутен поквалитетен мебел и подобро обработен. Освен дрвото, овде се среќавале и другите материјали кои се комбинирале со дрвото и добивале и естетски изглед. Освен основниот, неопходен мебел, се среќевавало и други дополнителни мебели и детали, како на пример лежалки за одмарање и слично, најразлични натказни и комоди кои биле подобро обликувани.

**Скандинавски дизајн**

Скандинавските и средновековните американски дизајнери придонеле за модерна обработка на мебел, користејќи нови материјали како и методи за виткање на дрвото. Природните ткаенини и органски обликуваниот мебел се главните карактеристики на скандинавскиот стил. Неутралната палета на шведските, данските и норвешките пејзажи во комбинација на изабен мебел, резултира со овој стил, кој се наоѓа на самиот врв на светскиот дизајн. Долгите зими со куси денови ја носат со себе потребата од ентериери кои ќе го надоместат недостатокот од светлина, па така скандинавскиот стил ги величи светлите бои,природните материјали и прозрачноста.

**Основни карактеристики на мебелот**

Скандинавскиот мебел се карактеризира со строги линии. Оваа

wood, with basic processing so as to provide the functionality and satisfaction of basic needs. The most common among them is furniture for primary storage, furniture for seating and sleeping.

While the wealthier people in homes in cities had better quality furniture with better techniques of procession. Besides wood, other materials can be found here combined with wood and receiving aesthetic appearance. Apart from the basic, necessary furniture, additional furniture and details we found, such as chairs for resting, etc., various cupboards and commodes that were better shaped.

**Scandinavian design**

Scandinavian and medieval American designers contributed to modern furniture processing, using new materials and methods for carving the wood. Natural fabrics and organic shaped furniture are the main features of Scandinavian style. The neutral palette of Swedish, Danish and Norwegian landscapes in combination with worn-out look of furniture, results in this style, located at the top of world design. Long winters with short days makes it necessary for interiors that would make up for the lack of light, so the Scandinavian style glorifies bright colors, natural materials and limpid.

**Key features of the furniture:**

Scandinavian furniture is characterized by strict lines. This

култура,како резултат на суровата клима, во ентериерот внесува модернизам и топла интимност. Редица производители започнуваат да се надоврзуваат на најновите тенденции, така што имитираат парчиња со голема вредност. Во мебелот е внесена друга димензија, нова тематика, освен ултилитарната функција, треба да имаат и скулптурален карактер. Во овој дух,се обработува дрвенаријата на тврд, пластичен начин. Дизајнерите вршат мали модификации на традиционалните типови на мебел. Забележително за скандинавскиот дизајн е умерената обработка на дрвото, што значи дека сепак се задржува природниот естетски изглед на дрвото.

Типичниот скандинавски мебел претставува микс од рамни линии со благо заоблени детали. Поконкретно, наслоните и седењето на столовите, ретко кога е под прав агол. Многу популарно парче мебел се клупите кои често се употребуваат во трепезариите наместо класични столици. Дрвото се употребува во посветли тонови како што се елата, бел бор и бреза.

culture, due to the harsh climate, brings modernism and warm intimacy in the interior. A number of manufacturers have begun to follow up on the latest trends, imitating pieces of great value. Another dimension entered in furniture, a new topic that except the utilitarian feature should have a sculptural character also. In this spirit, the woodwork is processed in hard, plastic way. Designers perform minor modifications to traditional types of furniture. Remarkably for Scandinavian design is the moderate wood processing, which means that it still retains the aesthetic appearance of natural wood.

The typical Scandinavian furniture is a mix of straight lines with slight rounded details. Specifically, the backs of chairs and seating, is rarely perpendicular. Very popular piece of furniture are benches that are often used instead of the classic dining room chairs. Wood is used in lighter tones such as fir, pine and birch.

**Слика 2. Софистицираност во простор**

**Picture 2. Sophisticated spaces**

Во спалните соби е поприсутен оној антички традиционален мебел, од

In the bedrooms, traditional antique furniture is prevalent, mostly made of

природно дрво, кое не е премногу обработено, видиливи се самите природни детали на дрвото. Најчесто рамовската конструкција на креветот се изработува од истото дрво како и мебел.

natural wood, which is not too processed, natural details of the wood are visible. Mostly frame construction of the bed is made of the same wood and furniture to store clothes or other items. Most often in the same style.

**Слика 3. Примери на скандинавски мебел**

**Picture 3. Examples of Scandinavian furniture**

Палетата на бои се базира на едноставен принцип: бела боја – од валкана до потполно чиста бела боја, беж, пастелна сина во комбинација со природно светло дрво. Сепак, чест исклучок во овие светли тонови е употребата на црвената боја и други интензивни бои, само во деталите кои создаваат контраст во просторот.

The color palette is based on a simple principle: white - from blurred to completely white, beige, pastel blue combined with light natural wood. However, an exception in those bright tones is the use of red and other intense colors, only in the details that create contrast in space.

**Основни карактеристики на стилот**

Многу често можеме да слушнеме дека убавината на скандинавските дизајн или движење не е целосно призната до 1950-тите. Од тогаш, овој минималистички Европски дизајн донесе слава на многу познати и значајни скандинавските дизајнери кои направија глобална марка од креирање на уникатен мебел до детали и елементи за домот.

**Key features of the style**

Very often we hear that the beauty of Scandinavian design or movement is not fully recognized until the 1950s. Since then, this minimalist European design brought fame to many famous and important Scandinavian designers who have made a global brand by creating unique furniture and also details and elements for the home.

Скандинавските дизајн што се протега на земјите од Данска, Норвешка, Шведска и Финска, нуди огромен еклектичен вкус

Scandinavian design that extends to the countries of Denmark, Norway, Sweden and Finland, offers an

кој го персонифицира овој дизајн, движење и се карактеризира со едноставност, функционалност и минимализм.

**Неутрални бои во скандинавските дизајн**

Мирните, пригушени тонови на бледо сино, цементно сива, бела и крем се присутни насекаде во скандинавските ентериери. Оваа шема на бои речиси претставува заштитен знак на скандинавските дизајн и се чини дека е една од главните црти на овој стил. Овие бои се уникатни за скандинавскиот минимализам, особено бледите нијанси, кои не се чести во северноамерикнските минималистички дизајни.

**Љубовта кон природата**

Скандинавците имаат длабоки корени, во однос на љубовта кон природата. Нивните активности се поврзани со природата, отвореното, како што се велосипедизам, пешачење и пливање-тие ја користат секоја можна прилика да бидат на отворено.

Се разбира, за време на студените зимски денови и ноќи, тоа го заменуваат со тоа што внесуваат природни елементи и детали во затворениот простор, ентериерот. Ентериерите се карактеризираат со бројни природни растенија и мебел кој ја имитира природата.

**Скандинавски мебел**

Модерниот скандинавски мебел носи предност во иновативниот текстил. Неверојатните изработки се уште можат да се видат во скандинавските домови денес, преку антиквитети и сегашните

enormous eclectic taste that personifies this design, movement and is characterized by simplicity, functionality and minimalism.

**Neutral colors in Scandinavian design**

Peaceful, muted tones of pale blue, gray cement, white and cream are present everywhere in Scandinavian interiors. This color scheme is almost a trademark of Scandinavian design and seems to be one of the main features of this style. These colors are unique to the Scandinavian minimalism, especially pale shades that are not common in North-American minimalist designs.

**Love of nature**

Scandinavians have deep roots, in terms of love of nature. Their activities are related to nature, the open space activities, such as biking, hiking and swimming, they use every possible opportunity to be outdoors.

Of course, during the cold winter days and nights, these activities are replaced by imported natural elements and details in the closed space, i.e. in their interior. The interiors are characterized by numerous natural plants and furniture that mimics nature.

**Scandinavian furniture**

Scandinavian modern furniture takes advantage of the innovative textiles. Incredible works can still be seen in Scandinavian homes today in the antiques and current designs.

In terms of furniture, one thing is certain, attention to detail and high

дизајни.

Во однос на мебелот, едно е сигурно, внимание на детали и високо-квалитетни материјали секогаш се клучни во скандинавскиот мебел. Мебелот главно се карактеризира со прави, чисти линии, едноставен но елегантен.

Нивниот мебел претставува уметничко дело, кое ќе трае низ целиот животен век. Доказ за ова е нивната примена на антиквитети кои секогаш имаат едно посебно место и значење до домот.

**Спојот меѓу античкиот мебел и скандинавскиот дизајн**

Дизајнерите на скандинавскиот модернизам, создаваат топол дизајн и повторување на модернистичките идеали. Нивната работа е основана со векови, со старите верувања во квалитетот и изработката на иделаната убавина, која треба да се поврзе со секојдневниот живот. Нежните, органски контури кои се типични за скандинавскиот модерен мебел, се појавуваат во работата на данските, финските и шведските дизајнери, не како стилски гест, туку како практични, ергономски и што е најважно – елегантни – одговор на човековото тело.

Анализирајќи го подетално скандинавскиот дизајн, пред се дизајнот на мебелот, ќе забележиме дека во уредувањето на ентериерите, голема употреба на антички елементи, антички мебел.

Тоа е и едно од карактеристиките на скандинавскиот дизајн, примената на антички мебел во домовите.

Најголемата примена има античкиот мебел за складирање на најразлични премети и алишта. Според

quality materials are always key feature of Scandinavian furniture. The furniture is mainly characterized with straight, clean lines, simple but elegant.

Their furniture is a work of art that will last throughout the lifespan. Proof of this is their application of antiquities that always have a special place and meaning to home.

**The connection between antique furniture and Scandinavian design**

Designers of Scandinavian modernism create warm design and repetition of modernist ideals. Their work is based on the centuries old belief in the quality and workmanship of ideal of beauty, which should be connected to everyday life. Smooth, organic contours that are typical of Scandinavian modern furniture, appear in the work of the Danish, Finnish and Swedish designers, not as a stylistic gesture, but as a practical, ergonomic and most importantly - sleek – response to the human body.

Analyzing the Scandinavian design in details, primarily the design of furniture, we notice that in arranging interiors there is extensive use of antique items and antique furniture.

It is one of the characteristics of Scandinavian design, the use of antique furniture in homes.

The biggest utilization has the antique furniture for storing various solid objects and clothes. According to the survey, the furniture located in

истражувањето, најголема примена античкиот мебел, наоѓа во уредувањето на спалните соби, каде што има поголем дел од мебелот за складирање во вид на комоди и плакари. Но овие парчиња обично се поврзани со стилот на рамовската конструкција на кревети и комоди со огледало. Значи можеме да кажеме дека овој спој во спалните соби многу често се среќава во антички стил.

the bedrooms it is mostly used, where there is a larger piece of furniture for storage in the form of sideboards and cabinets. But these pieces are usually associated with the style of construction with frame construction of beds and commodes with mirror. So, we can say that this circuit in the bedrooms is often found in antique style.

**Слика 4. Врската помеѓу античкиот мебел и скандинавскиот изглед**

**Picture 4. Relation between antique furniture and Scandinavian look**

Огромна е примената на ова античко ормарче, кое престваува пример и за античкиот. Најразлични негови варијанти среќаваме во уредувањето на спалните соби во скандинавскиот дизајн.

Инспирацијата за антички мебел на скандинавските дизајнери, пред се е резултат на примената на квалитетните природни материјали, нивните карактеристики - цврстината и трајноста.

Веќе ја спомнавме желбата на скандинавците за мебел кој ќе е траен и ќе ја задржи природната убавина низ целиот животен век. Токму ова е карактеристика на античкиот мебел и причина за нивна употреба во ентериерите. Употребата на природни

The use of this ancient cupboard, which also represents an example for ancient furniture, is huge. Its various variants are found in the arrangement of bedrooms in Scandinavian design.

The inspiration for the antique Scandinavian furniture designers is a result of the application of high-quality natural materials and their features - strength and durability.

We have already mentioned the main purpose and goal of Scandinavian furniture and this is to be durable and to retain the natural beauty throughout the lifespan. This is exactly the characteristic of the ancient furniture and the reason for use in interiors. The use of natural

материјали, односно на дрвото е едно од основните. Античкиот мебел, како примарен материјал го има токму дрвото, кое најчесто ја задржува својата основна убавина и текстура, што значи дека не е премногу обработувано, односно дека се работи за дрво, на кое му се видливи контурите и текстурата, не е лакирано или некои слични постапки.

Скандинавскиот дизајн се темели врз топлината на домот и обезбедување на катче за живеење кое зрачи топлина, мир, опуштање во него, па и овде имаме причина за инспирација во токму овие антички парчиња кои го надоплнуваат и зголемуваат ова чувство. Детали на антички мебел во комбинација со некои живи бои создава еден топол и разигран ентериер.

Во однос на боите, немаме некоја голема сличност меѓу антиката и скандинавскиот дизајн. Во антиката имаме примена на поживописни бои, додека кај скандинавскиот дизајн имаме примена на посмирени бои најчесто бледи, бели, беж и слично како основни, за што веќе ја спомнавме причината. Но тие најчесто се надоплнети и разиграни со шарени детали, текстури, материјали со цел да се разигра целокупниот ентериер.

materials, especially the wood is one of the fundamental. Antique furniture, as the primary material has exactly the wood, which usually retains its core beauty and texture, which means it is not too processed, and usually we are talking about wood with visible contours and texture, it is not painted neither has gone under similar procedures.

Scandinavian design is based on the warmth of home and providing a place for living, radiating warmth, peace, relaxation, so here we have reason for inspiration in precisely these antique pieces that complement and enhance this feeling. Details of antique furniture combined with some vibrant colors create a warm and playful interior.

In terms of colors, we have a great similarity between ancient and Scandinavian design. In antiquity, we have usage of vivid colors while Scandinavian design uses calmer colors often pale, white, beige and similar core, because of the already mentioned reason. But they are often supplemented with colorful and playful details, textures, materials in order to make the entire interior playful.

**Слика 5. Примери на скандинавски ентериери со антички мебел**

**Picture 5. Examples of Scandinavian interiors with antique furniture**

## Заклучок

Главен доказ за нивната одлична изведба,трајност и инзвонреден изглед е нивната денешна употреба во ентериерите. Конкретно примена во скандинавскиот дизајн, од каде што произлегува самата врска меѓу античката уметност и скандинавскиот модернизам.

Нордискиот декор е елегантен и едноставен – нема непотребни, само основни елементи. Основната боја е комбинација од црно – бела, меѓутоа постојат и детали и во други бои, како што се виолетовата, сина, зелена.

Анализата на античкиот мебел со примена во скандинавскиот дизајн може послужи, за да направаме еден спој, со цел да ги видеме заедничките карактеристики. Пред се се работи за античкиот мебел, кој често се среќава во скандинавските домови, со цел да се постигне една топла и идилична атмосфера. Односно традицијата на создавање на мебел да биде главен акцент во создавање на скандинавски дизајн, со тоа што самиот би се нахранил

## Conclusion

The main evidence for their excellent performance, durability and remarkable appearance is today`s use in modern interiors. Specifically, application in Scandinavian design, from which derives the link between ancient art and Scandinavian modernism.

Nordic decor is elegant and simple – there are no unnecessary, but only basic elements. The basic color combination is that of black and white, but there are details in other colors such as purple, blue, green.

The analysis of ancient furniture using Scandinavian design can serve to make a circuit in order to view shared characteristics. Above all it is about antique furniture that is often seen in Scandinavian homes, in order to achieve a warm and idyllic atmosphere, i.e. the tradition of the furniture to be a major focus in creating a Scandinavian design, by itself would feed Scandinavian

скандинавскиот модеризам со една друга историска страна.

modernism with another historical side.

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