Modeling the Process of Accounting Receipts Based on Payment Contracts and the Development of Software

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ABSTRACT:The article discusses the issue of automation of the processes of formalization of payment contracts in higher educational institutions. Proposed architectural model, which determines the activity of the created software tool.

The concept of the model of formation of electronic resources of payment contracts between the student and the higher education institution is explained by the use of software, the formation of the contract between the student and the institution of higher education, the calculation of contract funds by automation, the payment contract between the student and the university.

KEY WORDS: idef0, idef1x, BPMN, process model, evaluation, automation.

I.INTRODUCTION

The introduction of information technologies into the higher education system is one of the current issues nowadays [1,2,3]. The scope of their use is very wide one employee goes from job automation to the full automation of the activities of a higher educational institution [4].

Automation of the work of the administration of the university, the process of activity of the professor-teacher or departments work process-the main goal of creating an automated workplace for improving the quality of education [1,4].

The increase in the volume and intensity of information flow will bring about the need to increase the efficiency of its reception and processing with the use of software tools and technologies [8].

II. LITERATURE SURVEY

In the work of Nishanov A.X., Samandarov B.S. the problem of the formation of quantitative features from the initial set of various data types when constructing classification algorithms in conditions of high dimensionality of the feature space is considered. To solve this problem, a new approach was proposed, based on the logical separation of classified electronic educational resources.

In the article Smirnova N.A. The formation of the information society of the educational process is proposed. Modern education is characterized by a high level of technological equipment. System integration of information and telecommunication technologies in the educational process is a key moment of the ongoing reform and modernization of the education system.

In the article by A. Sokolov The definition of a system for managing a software product development process and the main variants of such a system are disclosed. A version of the system for the company "KKM02". The main provisions of the new system are disclosed and the SCRAM methodology is described, on the basis of which this system was developed.

III. PROBLEM STATEMENT

At present, one of the objects for which there is a need for automation for the higher educational establishment is the control of receipts for contract payments.

To do this, it will first be necessary to organize electronic recording of contracts between the student and the university. The reason is that in order to control the payment it is necessary to control two sums – the contract and the amount of payment made under this contract.

The first issue here is to model the process of formalization of the contract between the university and the student (enterprise or organization).

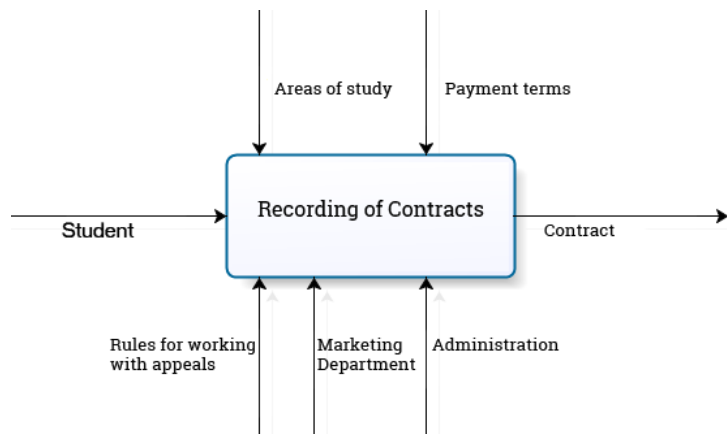Initially, we will build a generic IDEF0 [5] model of the contract recording process:

Fig1: IDEF0 model of the contract recording process

Based on the above, we should formulate the beginning of the process, the actions to be performed, the warnings, the process rules and the completion of the process [6,9].

The sequence of actions in this process consists of:
1. The student applies to the marketing department with an identity document for the purpose of formalization of the contract for study on the basis of payment-contract with the university.
2. Relevant employees of the department check the appeal and choose one of the necessary actions:
   - Rejection of application
   - Acceptance of application
3. In the first case, the student receives notification from the marketing department employee about the inadequacy of the necessary documents for the formalization of the contract.
4. In the second case, the employee of the marketing department forms the terms of the contract and submits it to the student.
5. The student submits the contract to the administration of the university, confirming its place within the specified period.
6. Administration formalize the contract and submit it to the student.
7. A formalized contract between the university and the student is recorded in the marketing department.

IV. PROBLEM SOLVING

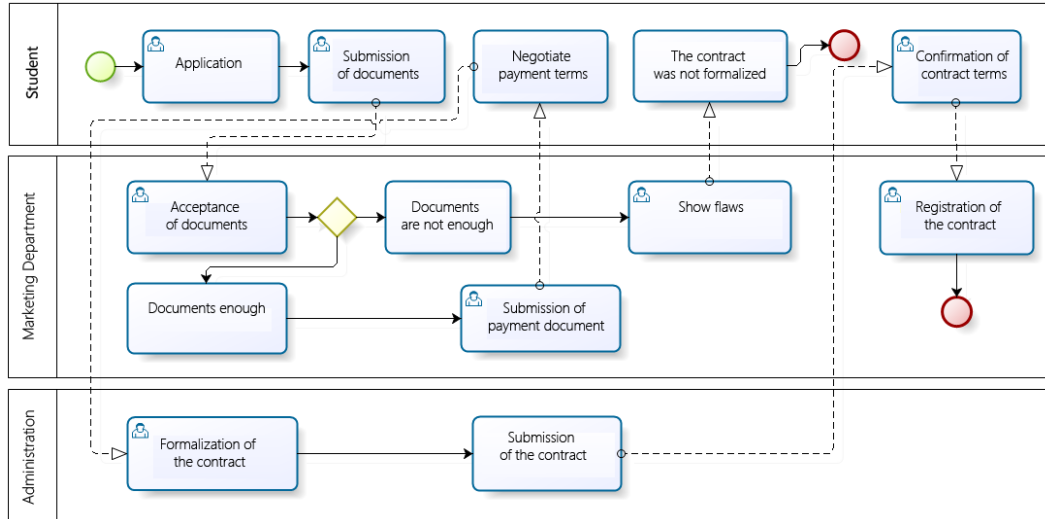Based on the above, the process of drawing a contract can be built on the model BMPN

Fig1: BMPN 2.0 model of the contract forming process

Taking into account that the marketing Department controls the execution of contracts and payment receipts, based on the model, we form the responsibilities of the office management Department:
1. Forming the list of students who receive education on a contract basis.
2. Formation of release blanks in the specified volume.
3. Electronic registration of contract agreements

Based on the above process model, we form a data structure. At this stage, we will develop views on the storage of electronic resources of payment contracts, in what areas the necessary information is stored and their communication models. To solve this problem, we develop the following essence-models:
    - questions to draw up a contract
    - Student formalizing the student loan agreement
    - Reason for refusal

For each of these essences, attributes (fields) are needed, and it is required to have the opportunity to enter them.The following Essence model describes what attributes are given for each essence:
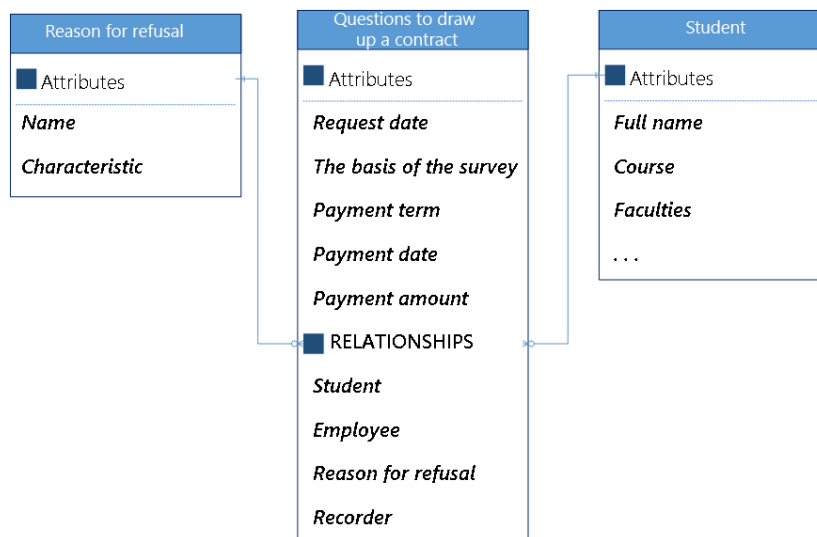

Fig3. The concept of the model of electronic resources based on payment contracts

It is also necessary to formulate relations between these concepts. We look at the reasons for the refusal and the student objects related to the object of the request for the formation of the contract.

Modeling the process of accounting receipts based on payment contracts and assessing these electronic information resources is achieved by extensive use of modern ICT to improve effective activities, including the acceleration of the processes of analysis and processing of documents. In addition to saving working time, there appear opportunities to improve its quality. To do this, the improvement of the quality indicator is carried out depending on the following factors:

- to provide timely direct reference to its internal and external MB electronic resources through automated jobs;
- digital coordination of activities (implementation);
- establish effective partnerships with customers by providing informative and visual documentation, as well as rapid software exchange of information;
- allocate the necessary time for highly effective activities, such as analysis, evaluation, etc., which add a large amount to the performance of tasks assigned to an organization.

Based on the above, they are required to solve the problem of modeling the work process in order to automate the process of maintaining the accounting of payment-contract receipts in the Departments of marketing services and accounting. The development of the software allows to quickly and operatively obtain the necessary information about the student's fees by classifying the payment contract receipts in the statement of events of the UzASBO programming complex. This allows to increase accuracy and speed in working with documents in place, reducing time and material costs as a result of the formation of reports in different sections. As a result, increasing accuracy and speed in recording the necessary data leads to unnecessary to re-fill the documents of some kind and the manual analysis of data, the description and storage of large volumes of data on paper, such as additional tasks will be abandoned.

Electronic processing of data is certainly considered very effective in relation to traditional, that is, manual processing. Proceeding from this, we will build the IDEF3 model of the payment classification process carried out by the student in the process of working the software tool, as in Figure 4.
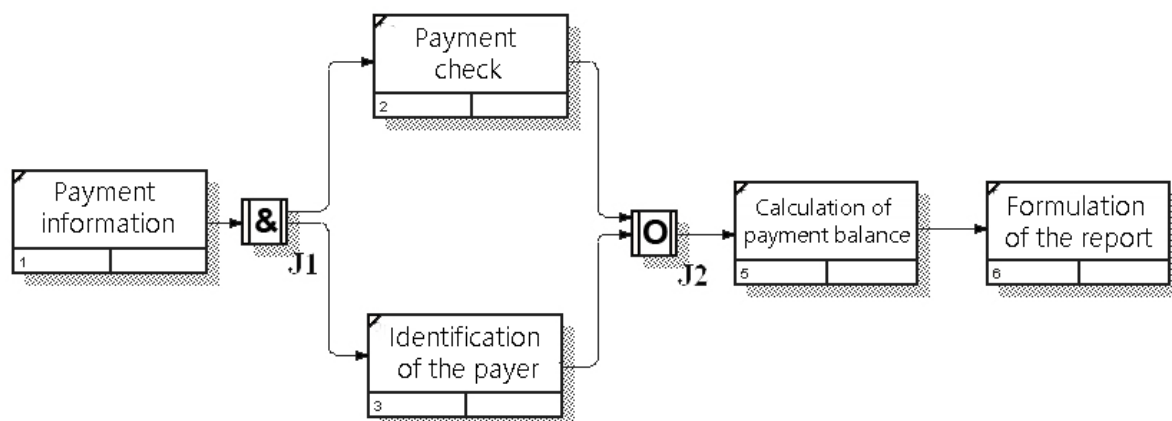

Fig4. Payment classification process IDEF3 model

Payments received on the basis of "selection of informative signs and algorithms of classification of electronic resources in the evaluation of electronic resources" are carried out control over faculties, educational areas, courses and groups. This process using IDEF1x notation 5-it is modeled in the form shown in the figure.

Fig5. Payment control IDEF1x model

Based on the above models, we achieve the formation of reports in the form required by the software tool.

Software has been developed on the basis of models of classification and control of payments offered. This in turn increases the speed of the processes of processing data in the direction of payment-contract receipts and the automatic distribution of them to students, increases the accuracy and reliability of recording payment receipts, saves time in the form of reports, increases the control of the work of employees and the effectiveness of the work process.

Users of the software tool work in two different modes: the administrator and the corresponding employee. The administrator performs actions such as setting the parameters of the software engine, managing existing users, importing the events record.

To operate the software, it is entered through a login-password in order to ensure safe access to the token, the password was encoded using the MD5 algorithm. If the user authentication is successfully carried out, it will be provided with an interface in the form of 6-th figure.
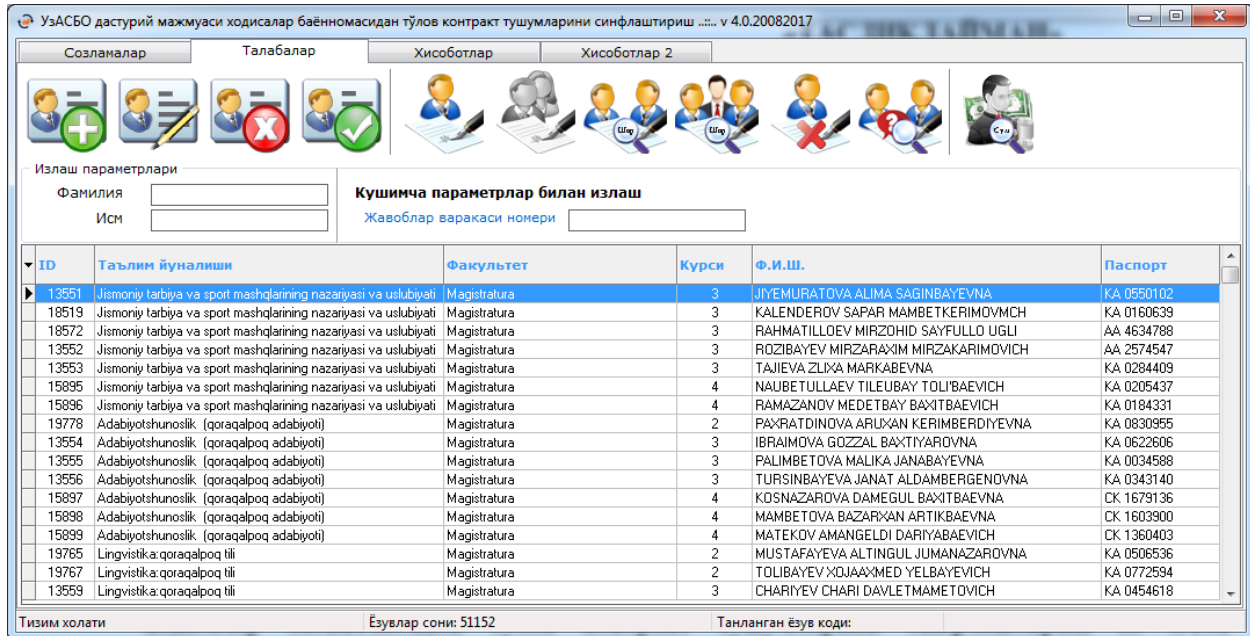
Fig6. Main window of the software tool

V. CONCLUSION

A software tool has been developed on the basis of models of software tool for the formation of electronic resources of proposed payment contracts. And this in its turn increases the speed of data processing and contract formation processes in the student's information, the increase in the accuracy and reliability of student records, the saving of time for the formation of reports, the control of personnel work and the efficiency of the work process.

REFERENCES

[1]Samandarov B.S. An adaptive model for assessing the status of electronic information resources. // Uzbek Journal of the Problems of Informatics and Energetics. – Tashkent, 2016. – №1. – 39-45 pp.

[2]Samandarov B.S., Tajibaev Sh.Algorithm and architecture of software for formation of quantitative signs from feature sets of electronic educational resources. //International Journal of Advanced Research in Science, Engineering and Technology. Vol. 5, Issue 10, October 2018. –P 7214-7218.

[3] Nishanov A.X., Samandarov B.S. Assessment model of monitoring and defining the completeness of course elements of information systems. // Journal European Applied Sciences. Germany, 2015, –№5. 56-58 pp.

[4] SmirnovaN.A. Management Information Systems in the Higher Education Process // Science and world, t. 2. – 2014. – №2. – P 127–128.

[5] CheremnyxS.V. Modeling and analysis of systems. I DEF-technology: workshop / - M.: Finance and Statistics, 2006. - 192 p.

[6] Arevalo C., Escalona M.J., Ramos I., Domínguez-Muñoz M. A metamodel to integrate business processes time perspective in BPMN 2.0 // Information and Software Technology. Vol 77, 2016, 17-33 pp.

[7] Matthias Geiger, Simon Harrer, Jörg Lenhard, Guido Wirtz. BPMN 2.0: The state of support and implementation // Future Generation Computer Systems, Vol 80, 2018, 250-262 pp.

[8] Michele Chinosi, Alberto Trombetta.BPMN: An introduction to the standard //Computer Standards & Interfaces.Vol 34, Issue 1, 2012, 124-134 pp.

[9] SokolovaA.A. Development of a software product process control system //Modern information technology and IT education. 2015. T. 2. № 11. P. 146-149.

[10] ФёдоровИ. Г. Modeling business processes in notationBPMN2.0: Moskva 2013. MESI. – 255 p.

[11] B. Silver. BPMN Method and Style: With BPMN Implementer's Guide. Cody-Cassidy Press. 2011. – 255 p.

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