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Protect university data from cybercrime during the Syrian crisis using technology

Dr. Nedal Alalo*

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□ ABSTRACT □

Since the start of the crisis in the Syrian Arab Republic suffered many universities and colleges affiliated facilities and higher education major damage, as the whereabouts of these universities in geographical areas where terrorist operations led to sabotage and exposed infrastructure of these universities and led in many places to transfer the headquarters of these universities and private universities from permanent places to temporary places to maintain the functioning of the educational process and to maintain the teaching staff and students in safe places far from conflict zones, and as a result of the transfer of the headquarters of most of the private universities to new temporary headquarters emerged as the importance of protecting the Giver T. These universities from loss and fraud, where these data include academic records for students and information teaching staff and teaching materials for colleges, where the biggest focus is to protect these data from plagiarism and fraud, which has emerged as a major problem as a result of these changes in the places of the universities.

So the aim of this paper is to invest in technology in creating new and unique method to protect documents students' academic from cybercrime and especially from plagiarism, fraud, change their records, as this innovative method uses the latest technology in encryption and protection of documents where use Quick Response Code is called abbreviated QR code.

We'll show in this paper how to use QR code in the protection of documents students and academic records and code will show the implementation of this method in ITTHAD private University.

Keywords : protecting university data, technology and law, cybercrime .

*Assistant Professor –ITTHAD Private University -Damascus -Syria.

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الدكتور نضال العلو*

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□ ملخّص □

منذ بدء الأزمة في الجمهورية العربية السورية تعرضت العديد من الجامعات والكليات التابعة لها ومنشآت التعليم العالي لأضرار كبيرة، حيث أن مكان تواجد هذه الجامعات في مناطق جغرافية شهدت عمليات إرهابية أدى لتخريب وتعرض البنى التحتية لهذه الجامعات وأدى ذلك في العديد من الأماكن بنقل مقرات هذه الجامعات وخاصة الجامعات الخاصة من مقراتها الدائمة إلى مقرات مؤقتة للمحافظة على سير العملية التعليمية والإبقاء على الكادر التدريسي والطلبة في أماكن آمنة بعيدة عن مناطق النزاعات، ونتيجة لنقل مقرات أغلب الجامعات الخاصة إلى مقرات جديدة مؤقتة برزت أهمية حماية معطيات هذه الجامعات من الضياع والتزوير، حيث تشمل هذه المعطيات السجلات الأكاديمية للطلاب ومعلومات الكادر التدريسي و المواد التدريسية الخاصة بالكليات، حيث أن التركيز الأكبر هو حماية هذه المعطيات من الجرائم الالكترونية ومن التزوير الذي برز كمشكلة كبيرة نتيجة هذه التغييرات في مقرات الجامعات.

لذا تهدف هذه الورقة العلمية لاستثمار التكنولوجيا في ابتكار طريقة فريدة وجديدة لحماية وثائق الطلاب وسجلاتهم الأكاديمية من أهم الجرائم الالكترونية وهي الانتحال والتزوير والتغيير، حيث أن هذه الطريقة المبتكرة تستخدم أحدث تقنية في التشفير وحماية الوثائق حيث تستخدم كود الاستجابة السريعة Quick Response Code ويدعى اختصاراً بـ QR code.

سوف نعرض في هذه الورقة كيفية استخدام كود الاستجابة السريعة QR في حماية وثائق الطلاب وسجلاتهم الأكاديمية وسوف نعرض تطبيق هذه الطريقة في جامعة الاتحاد الخاصة.

الكلمات المفتاحية :حماية معطيات الجامعات ، التكنولوجيا والقانون، الجرائم الالكترونية.

*مدرس– كلية العلوم الإدارية–جامعة الاتحاد الخاصة– دمشق – سورية.

Introduction:

A crisis is any event that is (or is expected) to lead to an unstable and dangerous situation affecting an individual, group, community, or whole society. Crises are deemed to be negative changes in the security, economic, political, societal, or environmental affairs, especially when they occur abruptly, with little or no warning. More loosely, it is a term meaning "a testing time" or an "emergency event".

Crisis is often linked to the concept of stress. In occidental culture, the term is often used to suggest a negative or fraught experience while in UK as a hazardous event and in oriental cultures like China it means danger and opportunity (Chinese characters used are Wei and Chi). In general crisis is the situation of a complex system (family, economy, society) when the system functions poorly, an immediate decision is necessary, but the causes of the dysfunction are not immediately identified.[1]

Crisis management is the process by which an organization deals with a disruptive and unexpected event that threatens to harm the organization, its stakeholders, or the general public.[1] The study of crisis management originated with the large-scale industrial and environmental disasters in the 1980s.[2][3] It is considered to be the most important process in public relations.[3]

A **crisis** is a significant unexpected disruptive event that affects an organization's Personnel, Facilities, Information Systems, or Critical Records, which in turn creates uncertainty and may dramatically impact profitability, reputation, or ability to operate normally if not handled in an appropriate manner[4]. The event could be large or small in nature, internal or external to the organization, and could be a natural disaster or human in origin. In addition, often stimulates extensive news and media coverage. Public scrutiny resulting from the disruption/event will affect the organization's normal operations and also could have a legal, financial, political and governmental impact on its business. As well, depending upon the industry and whether the organization is publicly traded, there are specific laws that dictate how an organization must conduct itself in notifying stakeholders and the public of a crisis. The laws have penalties for non-compliance, which may include levied fines and legal action with the possibility of incarceration.

Cybercrime is defined as a crime in which a computer is the object of the crime (hacking, phishing, spamming) or is used as a tool to commit an offense (child pornography, hate crimes). Cybercriminals may use computer technology to access personal information, business trade secrets or use the internet for exploitive or malicious purposes. Criminals can also use computers for communication and document or data storage. Criminals who perform these illegal activities are often referred to as hackers.

The techniques of crisis management include a number of consequent steps from the understanding of the influence of the crisis on the corporation to preventing, alleviating, and overcoming the different types of crisis.[5] Crisis management consists of different aspects including:

- Methods used to respond to both the reality and perception of crisis.
- Establishing metrics to define what scenarios constitute a crisis and should consequently trigger the necessary response mechanisms.
- Communication that occurs within the response phase of emergency-management scenarios.

Related Work:

Many universities in Syria made a lot of changes in management processes according to the current situations , that the main and the most important thing is the development from the paper based systems in university daily academic processes to the electronic systems , that Damascus university has developed a security system for Authentication for students certificates [6], as shown in the figure(1) below:



Fig.1 : Damascus University Authentication system



Fig.2 : Damascus University Authentication system

That this developed system is the first one in Syria to protect students certificates from cybercrime, that also universities around the world can use this system to check the validity of the students certificates who are applying to these universities.

Proposed Method :

As my role in the private university of ITTIHAD [7] , I tried to face the bad situation about the situation in the area of the university , that we make many changes and processes to face the bad effects of the situations, and as a university the most important thing for as is the safety of the humans (students, academic staff) , and the safety of the information (academic staff information , student records information) . so to protect all these things we have done many steps to achieve the goal of safety in general .

For the safety of the students and academic staff the ministry of higher education accept to move the university to temporary place in Damascus , because the situation in Damascus is safe and the daily life is easy to people .

And for the safety of the information we have made a Duplicated server for the central data server of the university that the central server of the university conations the academic staff information and the students information , which contains the students personal information and the students study profiles and the academic subjects resources . and we change many process to the fully based electronic systems .

That we make the registration of students and academic staff electronic based which means that the student can register in the university and can take subjects from his home or any other place far from the university place this thing offer a lot of flexibility in students physical movements.

And the academic staff can upload their files into our system from any place far from the university place.

But in the new electronic systems we have to be conscious to the safety of documents, that the electronic documents must have a protecting technology from cybercrime operations especially Falsification ,that we have implement a method for encrypting the students information into the database in the central server of the university , so that the data have first level of protection , and we make Tow dimension barcode for every student profile sheet . this barcode is knows as QR code(Quick Response Code)[8] which is the trademark for a type of matrix barcode (or two-dimensional barcode) first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store data; extensions may also be used.[9]

The QR code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing.[10], the following figure below shows the QR code :



Fig.3 : QR Code

A QR code consists of black squares arranged in a square grid on a white background, which can be read by an imaging device such as a camera, and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data is then extracted from patterns that are present in both horizontal and vertical components of the image.[11], the following figure below shows the data parts of the QR code

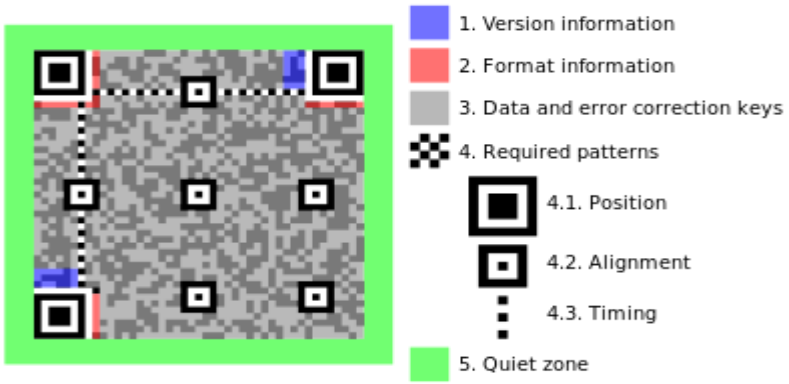


Fig.4 : Structure of QR Code components [12]

QR code has become a focus of advertising strategy, since it provides a way to access a brand's website more quickly than by manually entering a URL.[13], That our proposed method generates student information and student study profile and generates a QR code for these information to prevent them from Falsification ,that on our university portal can every one or every academic institute be certain about the validity of the student information by scanning the QR code which is generated and printed on the student information , also there is a unique code (security serial code) which is generated and printed on the student information (personal and academic profile information)

System Design and Implementation:

We have developed a system for protecting student data in ITHAD Private University from falsification, that this system have a login page so that only users who have permission will enter this system ,

The following figure shows the login page of our developed system :



Fig.5 : login page of the developed system

After the user login in the system he will forwarded to the admin page which contains three main operations , student registrations , students database browsing , QR codes generating , the following figure shows the main operations of the admin page :



Fig.6 : admin page of the developed system

In the student registration we register all the students important data which contains the student personal information and the graduation information such as graduation date and average , the following figure shows the registration page :



Fig.7 : registration page of the developed system

And in the student database browzing the operation shows all the registered students in the system, the following figure shows the database browzing :



ID	fName	mName	lName	birthDate	gradDate	gradAVG	college	department	
1	ahmad	hassan	hammod	4/4/1994	30/7/2016	70	Engineering	Architectural Engineering	View Details
2	ammar	helal	ahmad	1/1/1990	30/7/2016	90	Engineering	Information	View Details
3	mohammad	anas	homi	15/1/1993	30/7/2016	65	Pharmacy	Pharmacy	View Details

Fig.8 : database browzing page of the developed system

In the QR code operation the logged user generates the QR code for every student and this QR code image put on its graduation certificates, so that this code operates as a security code that in every place into the world every one who can scan and read this code

can be sure about the information in the certificates, the following figure shows how the QR code is generated :



Fig.9 : QR code generating page of the developed system

There are two ways to read this code, and when reading this code the system forward the user to the certificate information of the student ,the first method is to upload the QR code image to our developed system so the system read it and decode it and forward the user to the student information (personal and graduation information), the second one is to user QR code reader application for android systems which can read the QR code images and it also forward the user to the student information that are stored into the University Central server .

Test and Results:

After developing this security system we have protect our student certificates from falsification, that our if someone get a certificate for student in ill legal method and change its information to its own personal information when parsing or reading the QR code image the system will forwarded the user (the user who detect the certificate) to the original student information not to the student information which are written in the certificate document, because the plagiarized user can change the personal information of the certificate document but cannot change the QR code image , and if the plagiarized user alter on the QR code image the system will forward him to error page because the reader of the QR code will not recognizes the decoded QR code image because the plagiarized user has changed it and destroyed the structure of the information in the Auto generated QR code image.

Discussion:

Our developed method is the best method for protecting data from Falsification that if someone tried to plagiarized other certificate he can change the readable information of the certificate document ,but cannot change the QR code image which is printed into the certificate document, to be clear he can change the QR code image but cannot change it in a correct formula, so when scanning the altered QR code image the system will search for the altered image and will not find any matching into the system DataBase so it will detect that the scanned document is plagiarized and the person who holds this document is not the origin student who is the right owner of this certificate document. and by using this method for protecting students certificates the universities in all world can be certain about the reality of the certificates of our university in few minutes by scanning the QR code image on the certificates, this method make the process of the approving of the certificates validity very easy and secure and take few minutes than the ordinary method which contains sending the certificate from the university which the student will register in it to our university to ask about the originality and the validity of the certificate information, taking into consideration that this process take a very long time to executed and finished .

Conclusion and future work:

We conclude from our proposed method that we protect our students certificates from plagiarism and falsification that the integrity of the academic information is essential thing in the higher education sector, and the current circumstances of our country generates many bad affects on the higher education sector so we have searched and developed our system to resist these bad affects.

In the near future we will print the QR code image on all the certificates of the students , that the current system print the QR code image only on the graduation certificates of the students , and in the future we will print this code to all documents of students academic profiles .

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