Digital badges in education: nature and implementation

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Abstract: There are many evidences of how education is conducted, partially or entirely, in the virtual environment. Nowadays, the processes of acquisition of new knowledge and skills, and fostering the proper motivation in the learners have to fully comply with the 'avalanche' of new technologies that flows over the education. The digital badges have a dual role - on one hand, they are the new technology, and on the other, they appear as a tool to help educators in need of finding an effective method to motivate learners in the virtual space. The current paper aims at examining the nature of digital badges - their creation and their use in virtual environment from a rhetorical viewpoint. For the purpose, a corpus of 20 digital badges from different virtual educational platforms has been subjected to visual analysis.

Keywords: digital badges, virtual environment , new technologies in education, visual rhetorical analysis.

Дигиталните баджове в образованието: същност и приложение

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Абстракт: Редица са примерите за това как обучението вече се извършва, частично или изцяло, във виртуална среда. Придобиването на знания и умения и създаването на правилната мотивация у учащите днес в пълна степен трябва да се съобразява с лавинообразното „изникване" на все по-нови технологии, които намират своето място в образованието. Дигиталните баджове имат двойна роля – от една страна те самите са нова технология, от друга те се появяват в помощ на обучаващите, които трябва да открият ефективен метод за мотивация на обучаваните във виртуалното пространство. Настоящата статия има за цел да разгледа природата на дигиталните баджове – създаването и използването им във виртуална среда от гледна точка на реториката, като подложи корпус от 20 дигитални баджа от различни виртуални образователни платформи на визуален анализ.

Ключови думи: дигитални баджове, виртуална среда, нови технологии в образованието, визуален реторичен анализ.

Introduction

The digital badges are visual markers that we utilize more and more often in different types of industries such as entertainment, formal and informal education, HR and professional development, etc. The particular focus in this article is on the use of digital badges for the sake of education, while zooming on the rhetorical aspects of persuasion – one of rhetoric's core functions, along with information, communication and education. Thinking of badges as visual artifacts leads to the question: Is it possible to analyze them with the instruments of the visual rhetorical analyses?

Exploration of the current research on badges interestingly shows that they have been just recently added in the spotlight of the academic research: Google search on "digital badges" dates from 2010 [1]. There are several definitions on what digital badges are. One of the definitions provided is that badges are a "validated indicator of accomplishment, skill, quality or interest that can be earned in many learning environments" [2]. Another definition by Willis, Quick and Hickey (2015) dwells upon the fact that „Open digital badges contain multiple points of valuable educational data including assessments, specific skills development, and validation amongst others." [3]. Yet another definition comes from Fanfarelli and McDaniel who define digital badges as „…visible markers of achievement that

exist in a virtual space." [4]. One of the well-explained definitions is that of Gibson, Ostashewski, Flintoff, Grant and Knight, who expand on the nature of the digital badges as being „… a representation of an accomplishment, interest or affiliation that is visual, available online, and contains metadata including links that help explain the context, meaning, process and result of an activity." [5]. From all provided definitions, I ~~should~~ conclude that, according to my understanding, the digital badges are **a visual artifact in virtual environment that includes a visual image and (hyper) text that signifies the validation of accomplishments, skills, knowledge acquisition, or belonging to a community**. This is not a full definition, but a good working one that I will use for the benefit of this research.

Structure of the digital badge

The digital badges across the Internet vary with their specific characteristics and elements. The most common elements of a digital badge (see Figure 1.) are, but not limited to:

1. Name
2. Visual representation
3. Textual explanation
4. Hyperlink or hypertext for further explanation (could sometimes substitute the textual explanation entirely)
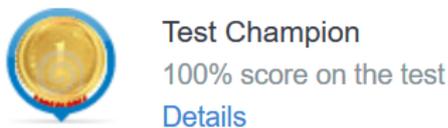

Figure 1. (Author's personal collection of badges on Edmodo)

In the case of the open badges, we could observe a set of information about accomplishments, embedded in an image file in the form of a digital badge, which uses an infrastructure for badge validation. Open badges are free, transferable from multiple sources and easily displayed publicly in the virtual environment. The open badges specification, standards and infrastructure were initially developed by Mozilla with Funding of the MacArthur Foundation [6]. So, open badges could also contain the following elements (see Figure 2.):

5. Criteria and standards for awarding
6. Issuing organization details
7. Date of acquisition

Your badges

Figure 2. (Author's personal collection. Note: the hyperlink is embedded within the visual artefact)

In the case of the provided open badge example (Figure 2.), we could observe the same elements, characterizing all digital badges like a name (Introducing Project-Based Learning in your Classroom Course Badge), visual representation (the circle with pictograms, texts and a ribbon crossing it in the bottom), textual explanation (very detailed title, presented in the visual as well), hyperlink (embedded into the visual representation). We also could see the issuing organization – Teacher Academy. When we click on the image, the hyperlink is taking

us   to   more   details   on   the   badge   –   see   Figure   3.   below:

Figure 3. Detailed description of an open badge

In the expanded view, we could monitor the criteria for awarding this badge, what accomplishments it signifies and a further textual description.

An important aspect of the digital badges, in contrast to the open badges that have more elements and could be shared easily via social networks and e-Portfolios, is that digital badges are context-dependent. For example a badge, created for an online game, would not make any sense for a person outside the game community. The same would be valid for a badge created by a teacher for the purposes of a certain class, and then taken out of the class environment it may not make any sense, if it is introduced into another class and subject. That is why digital badges should be carefully transferred from one educational environment to another, as it is the practice in the virtual educational platform Edmodo [7], where teachers could adopt badges created by their fellow colleagues and have been given public status.

Functionality of the digital badge

Badges have been used as stimuli for many centuries now, when they emerge in their digital form in computer games, corporate and educational virtual platforms, social networks and media, etc. Most of the researcher of badges outline that historically they have been used in religious, political and military environment (as ribbons, medals, insignia, pins, etc.) and later on in scout organisations [8] [9],where boys and girls have been awarded badges for many different reasons: (1) to signify the belonging to a certain community; (2) as a recognition of an achievement; (3) accomplishment; and (4) skill validation. According to Reid and Paster, digital badges are used creatively in academic setting: "Whereas some badge systems award digital badges for higher order accomplishments such as degrees, certificates, or course completion, other systems recognize participatory or achievement-based activities, using badges as a gamification and motivational device." [10]. The digital badges have been studied as being an integral part of computer games in which they are mostly adopted as signifiers of achievements and progress, as well as hooks to further continue playing. Some of the most popular games that use digital badges integration throught their whole gameplay are: The Sims (The Simulations), Call of Duty, Dragon Age, etc. In some games we could observe the visual representation of a badge, but they are called trophies or achivements. Badges are also used to obtain resources and tools in certain games that seek to establish virtual economy, thus way the owner company "may incorporate procedures allowing players to use credit cards and spend actual cash to buy tools and characters that allow them to play and win more efficiently." [11]. We could conclude that in corporate environments, in which badges are

used in gamification, badges are indulged with another function – to finacially profit the company-creator.

The president of the American Educational Research Association, Eva Baker, envisioned the role of badges as markers of qualification in a more integrated and adequate manner in the secondary education, that should not rely on formal tests to reveal students potential. She pointed out that "the path of Qualifications shifts attention from schoolwork to usable and compelling skills, from school life to real life." [12]. When we refer to badges in pedagogical and educational perspective we should add couple of pedagogical functions such as marking (1) the acquisition of knowledge; (2) verification of skills and abilities (21st skills – communication, collaboration, creativity, critical-thinking, digital citizenhsip, etc.); (3) signifying engagement and sustainability in learning.

If I have to summarize the functional characteristics of the badges that were listed in the literature review above and the later suggestions I would conclude the following: (1) signification of the belonging to a certain community; (2) recognition of an achievement, (3) accomplishment; (4) validation of a skill; (5) recognition of knowledge acquisition; (6) signification of an engagement and sustainability in learning. Of course this list is not in any sense exausted and is a subject to future editions, because the badges are not meant to be used in a scholistic manner, but rather in a creative approach in which the educators could invlove the students, making them more active, engaged and motivated.

The "talk" of the digital badge

After having looked at the structure and functions of the digital badges, I want to explore further their implementation in education as visual artifacts that could be a subject to visual rhetorical analysis. The early studies of images are found in the work of semiotic researchers such as the Belgian semiotic school called the Group µ [13] and the French semiotician Roland Barthes. In his work "Mythologies" [14], Barthes uses the term "myth" to describe the specific communication dimension via which different socio-cultural phenomena are presented from an exact ideological viewpoint (in his case the bourgeois class ideology). Barthes argues that the image (cave paintings, posters, photography, etc.) has the same abilities to "talk", to send specific messages [15], as the text does. Sonja Foss defines visual rhetoric as "artifact or perspective; areas of focus as nature, function, or evaluation; and methodological approaches as deductive or inductive in their movement between visual artefact and theory." [16]. According to Mark Pepper, Allen Brizee, Elizabeth Angeli of Purdue University they state that "a visual document communicates primarily through images or the interaction of image and text." [17]. The brief literature review shows that a badge, as a carrier of both visual and textual information, could be subjected to visual rhetorical analysis. The most important function of a rhetorical artifact is to convince and to persuade, along with its communicative, informative and educational purposes. One can also ask the question: "Does the image provide direct and valuable information?", or "Does it immediately relay a message what is going on?", and even "Is this badge confusing in a way?".

For the visual analysis, I have collected a relatively small corpus of 20 digital badges and decided to analyze the following: (1) context; (2) frame; (3) visual objects; (4) audience. As I have already mentioned, context is very important for badges, so I have observed what context the corpus of badges are emerging from. The frame is related to what is the visual information, of what is seen, and of what is not seen, but we might get as a cognitive construct from the presented visual. The visual objects or artefacts are the details of the visual that are reviewed for further harvesting of information like the color, space, style and so on, which could be part of the visual rhetoric and communication. These visual artefacts could be perceived as visual rhetorical figures and tropes. And last but not least – the targeted audience – who the receivers of the digital badges are, their status and characteristics.

The first set of 5 badges has been taken out of my profile in ClassDojo [18] educational platform. These are inbuilt badges that are used for junior students' motivation and parents' engagement. The moment a badge is awarded it could be seen by the student and by his/her parents. Basically, the digital badges are separated in two major categories: "Positive" and "Need work". At first glance, some of the visual artefacts, without consulting the text, are confusing (see Figure 4.). The "crown" for example, without its texts, is not giving enough information on what it is attributed for. In this category of visual ambiguity I will put also the "microphone", "planet Earth" and "plane" visuals. The text provided is also somehow scarce in some of the badges – "Persistence" + "planet Earth". Perhaps we should go beyond the frame and conceive the allegory of persistence as being the quality of the task of the Greek titan Atlas, caring the Earth on his shoulders. Or adopt a more simplistic approach of the scientific fact that the Earth is spinning around restlessly. The other visual that could be confusing is the ascending plane pared with the text "Working hard". It is indeed hard to set off ground sometimes, but when you get flying and see the land below, you see the "fruits" of the hard labor.

Figure 4. In-built, positive badges from the author's ClassDojo Profile

The color green used on the number markers (that signifies the amount of badges of that type received) to represent the positivity of the digital badges is an analogy of the traffic lights – green means "proceed", red means "stop" (needs work, improvement).

It is hard to believe that these images could be understood by the majority of kindergarten and junior students who still develop understanding of the symbolism vested in images. They need additional explanations to comprehend the visual and textual input of information delivered by the badges. The true target audience here is the parents, who would timely and consistently get concise visual information about their kid(s) performance during the day.

Edmodo Digital Badges

The next set of badges is selected from the educational virtual platform Edmodo. These are badges collected from different teachers that have shared them for use by other educators (See Figure 5.).
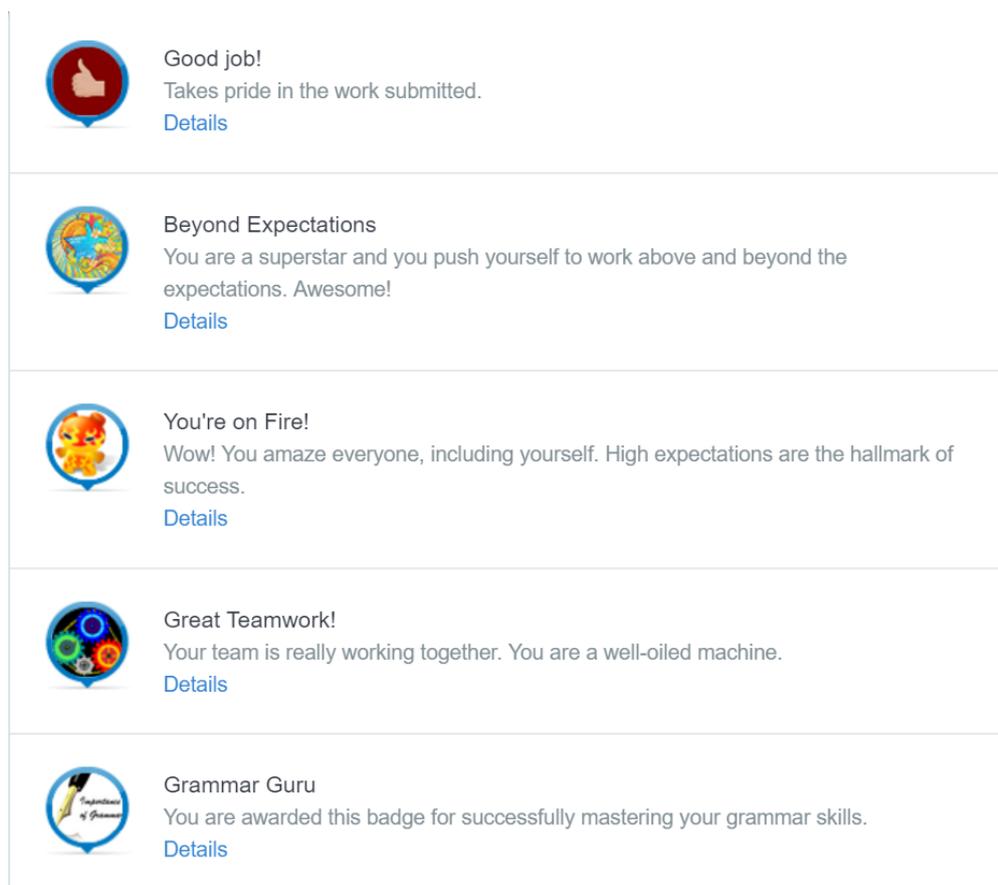
Good job!
Takes pride in the work submitted.
Details

Beyond Expectations
You are a superstar and you push yourself to work above and beyond the expectations. Awesome!
Details

You're on Fire!
Wow! You amaze everyone, including yourself. High expectations are the hallmark of success.
Details

Great Teamwork!
Your team is really working together. You are a well-oiled machine.
Details

Grammar Guru
You are awarded this badge for successfully mastering your grammar skills.
Details

Figure 5. Digital badges from the author's collection in Edmodo

Though randomly taken, the screenshot reveals similarities that some of these badges have in common with the previous in-built badges of ClassDojo in regards of their names and function. Edmodo is an educational virtual platform that provides for blended virtual education from kindergarten to university and beyond. It has many features and a special option for badges creation. In this sense, badges can be tailor-made to suit the needs of every course, educator and students. What we could see on the badge is a visual image, title, description and a link for details, all the elements of the digital badges structure. Since these badges are created mostly by educators without special visual design skills, ~~and~~ a certain amount of ambiguity could be detected when subjected to analysis. One of these examples is the badge "Beyond Expectations". Although it has a well-structured textual explanation, the visual details are hard to be outlined. In the description the word "star" could be related, with an additional effort, to the blue star visual representation on the badge. Still, the visual artefact is not well-associated with the title and the description and there is a dissonance of meaning. Whether the influence on the receiver of the badge is weaker it is hard to say without investigating further with a survey among the learners and other educators that have decided to use it.

The badge "You're no Fire" resembles a teddy bear (or another kind of toy creature) with a texture of flames of yellow and orange. The visual metonymy immediately grabs the attention. The visual representation of the student – the teddy, is "on fire", a term describing the amazing performance of the student. However, the image is complimented with a rather not so cohesive text "…You amazed everyone, including yourself." We could register a sense of irony, if the badge is taken out of the context.

"Great Teamwork!" is a well-suited representation for rewarding collaboration and team player efforts. Using the wheel mechanism interdependence as a visual metaphor for the beneficial team work in class, the badge could be ranked as one with cohesive visual and

textual message. Outside the frame, a further association could be drawn out of the fact that each wheel in the machine is very important for the whole, as is the collaboration and teamwork skills of each individual in a social group. This is of enormous importance when educators try to convey the messages why particular piece of knowledge or skill is important for students' future academic and career successes.

The audiences here are again students and their parents, with a stronger emphasis on elementary and secondary students', because Edmodo is not that popular with kindergarten and to a lesser degree it is used in universities.

Khan Academy Digital Badges

The company owning Khan Academy defines it as a "personalized learning resource for all ages" [19]. They also use a badging system that is distributed in several main categories from more common such as the "Meteorite" group of badges to "Black Hole" group, which are the rarest on Khan Academy. The digital badges of Khan Academy are awarded after gaining a certain amount of points by interacting with their virtual learning environment – watch videos, read articles, answer questions, etc. They are used in elementary and secondary school and universities settings, where the learning could be assigned by the educator or could be a self-initiated by the student. In this sense, the learning in this virtual space is asynchronous and the badging system helps with the motivation of the student, especially with those that are self-motivated.

When students start to earn points for performing various learning activities, different badges from the different badges groups are attributed to each student, based on his/her unique sequence and number of learning actions. The digital badges in the focus of this study's attention are from the Meteorite and the Moon group (See Figure 6. and Figure 7.).
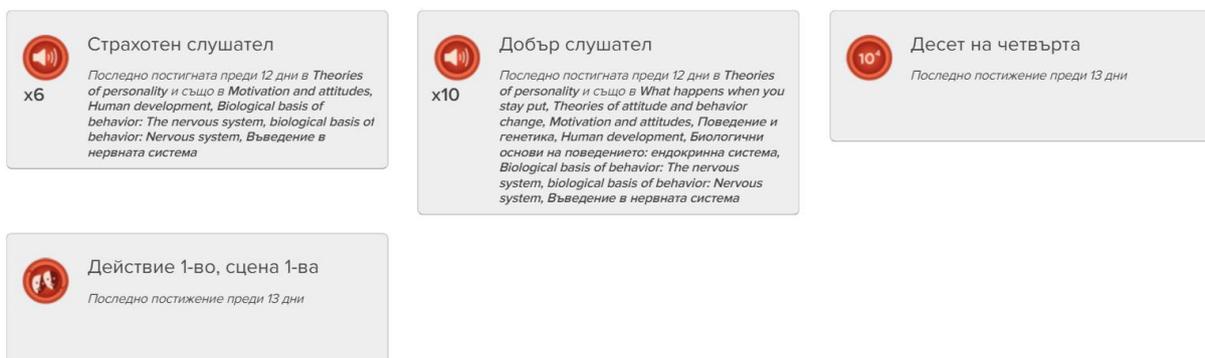
Figure 6. Meteorite badges of Khan Academy

Figure 7. The rare Moon Badges of Khan Academy

All the badges of a certain group are in a particular color, e.g. the Meteorite Badges are reddish, and the Moon Badges are in tilt color, and so on. Each color corresponds to a certain group. There is no color variety within a group. The rarer groups of badges such as the Moon, Earth, Sun, etc. have similar badges like the Meteorite Badges group, but they are awarded for a higher score and accomplishments. The badges signifying minutes and later hours spent on watching virtual video lectures are depicted with a speaker and sound coming out of it. These badges could be grouped as the "Listener" badges and are present across most badge groups. The image is well complimented with a title and additional text that could have a hypertext, which with one click, expands the information field and further details could be acquired. The speaker could be also considered as a visual synecdoche in which the part represents the whole computer system and on a greater level the process of virtual learning by the means of the information and computer technologies and the Internet.

Open2Study Digital Badges

Open2Study [20] provides free and accredited university courses. The badging system revolves around the basic learning activities, similar to Khan Academy's (See Figure 8.), as well as there are profile related badges, social exploration badges, the learning community related badges, and some special badges. The reviewed badges are related to the learning related badges also called "Treasure hunt" badges. The parallel with the game treasure hunt, highly exploited in education and gamification, is obvious.

Figure 8. Open2Study Badges

The audiences associated with the badges consist of people seeking free university courses and professional development. The badges are also graded in a consecutive order: e.g. bronze key, silver key, and golden key. What is seen within the frame is stylishly related to the description in the text images. There are no hypertexts and hyperlinks provided. All the information is immediately available for the learner and what could be observed is a bolded text making a visual emphasis in the badge's description.

The badges related to watching video lessons are represented by a key. For watching the very first video, the learner receives a Bronze key of enlightenment badge. The color bronze of the wavy outer frame indicates that fact. For watching 40 videos – a silver framed key badge; and for watching 80 videos – a golden framed key badge. What could also be observed here is a visual paronomasia – an image suggesting two or more meanings. The key represents the fact that watching videos unlocks either further knowledge, or the treasure chest at the end, but it

also symbolizes closing of a chapter, module or chunk of information. For the assessment and quizzes the learner receives coins (bronze, silver and golden) and gem stones (emeralds, rubies and diamonds). There are badges for signifying the overall performance of the learner that are represented by a map – one that will lead to the course completion and the "booty chest" at the end. There is a carefully tailored badging logic and gamification elements in the learning process of the Open2Study learning platform.

Findings and conclusion
In the current article, I have examined the structure and functions of badges in educational contexts. There are two main groups of badges in the virtual learning spaces: digital and open badges. Most of the badges have a title, description and a related image, but could also have hyperlink or hypertext leading to further information and credentials on the attributed badges. As of their functionality related to the pedagogical practice the digital badges, but are not limited to: signification of the belonging to a certain community; recognition of an achievement and/or accomplishment; validation of a skill; recognition of knowledge acquisition; signification of an engagement and sustainability in learning.

The analysis of the literature and the corpus of badges chosen showed that badges are used across diverse educational audiences – from kindergarten to adult learning and professional development. It was also evident that like any other artefact containing visuals the badges could be subjected to visual rhetorical analysis. As a limitation to the study stays the fact that the badges, both made by professionals and by educators without visual design skills sometime contain a certain amount of ambiguity – the image is not clear enough or there is dissonance in the meaning conveyed by it and the textual body that describes it. The visual rhetorical analysis revealed that there are a lot of rhetorical devices present in the digital badges that serve the main function of rhetoric – to influence and convince, which, when it comes to the functions of badges to certify knowledge and skills acquired and be part of an e-portfolios, is a very important aspect. Among the studied badges there are visual metaphors, allegories, metonymy, synechdoche, parnomasia and even irony. These virtual visual rhetorical tools are expressed through images, symbols, forms and colors.

A limitation of the study is that it is based on a rather small corpus of 20 badges only. There is space for future rhetorical investigations on the subject and evidently from the study it could be suplemented with additional reseacrh tools like surveys and/or interviews to get better perspective on the influence digital badges cast on learners, educators, parents, employers, etc.

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