

EDUCATIONAL ANIMATION AS A COMPLEMENTARY TOOL TO CONVEY KNOWLEDGE TO CIVIL CONSTRUCTION WORKERS

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ABSTRACT

The use of resources which enable the modeling of information has been growing in the media and also in the educational context. The objective of this article is to adapt a model for the narrative construction focused on the development in the educational animation field, facing the reality in civil construction as an aid in the process of transferring knowledge for the construction workers. The literature review was performed as a research strategy and after the analysis a reference model was chosen in order to elaborate the educational animation. Then, the adaptation of the model to civil construction took place. The Lean Construction Primer was selected from the literature to exemplify the developed proposal. The analysis of correlated themes confirms that the contemporary languages used for education motivate, involve and assist in the memorization of the learner. It is expected to contribute with the development of educational animation in the civil construction directed to the construction workers as well as encouraging discussions on similar issues.

Keywords: Educational animation, narrative, civil construction.

1. INTRODUCTION

The sectorial development of civil construction is pointed out as one of the reasons which influenced the search for training courses for workers in the area. However, what is perceived is that there is often a gap between the knowledge and the transmission of the craft, which hampers the learning process.

Chiavenato (2010) alerts to the need of professionals with better qualification. It states that unemployment rates are lower where educational levels are higher.

Brandenburg and Byrom (2006) when analyzing construction, state that companies which invest in planning and human resource management strategies have achieved high levels of performance, including high productivity, cost efficiency and company effectiveness overall.

Despite the efforts to overcome disability in vocational training, those are still considered insufficient when analyzing the gap in the quality of the available worker, in relation to what would be considered ideal for a

greater sectorial development of the civil construction (ABRAMAT, 2007).

The discussions raised reveal a convergence of opinions when considering the transfer of knowledge to the training in civil construction relevant.

In this context it is important to stick to the new forms of knowledge presentation, since they can prove themselves beneficial in the teaching-learning process.

Therefore, adapting a narrative construction model for the development of educational animation to the reality of civil construction, (as an aid in the process of transmitting knowledge to the construction workers,) is presented as one of these new forms of knowledge presentation.

2. THE TRANSFER OF KNOWLEDGE

Flor et al. (2009) They affirm that, in the last decades, knowledge was recognized as something to be constructed by the learner himself in his relations with the social environment, and no longer as volume of information passed on by the teacher. In this context, the use of media or multimedia is increasingly growing with the aim of interacting with the user, based on information in diverse presentations.

Portugal (2014), Affirms to be fundamental to look for new models, methods and approaches capable of including the contemporary languages in teaching. Among them, we can highlight multimedia, hypertext, audio, video, animation, among others. Such approaches can provide significant information and create pleasant experiences in the teaching-learning process, according to the author.

This research is classified as qualitative and has an exploratory character. The article intends, with the literature review, to choose a reference model for the construction of educational animation and based on the analysis of this model propose an adaptation for the civil construction, directed to the construction workers. It is important to emphasize that the proposal will be the first phase of the conception of educational animation; the moment the narrative is built. This phase is responsible for defining the content needed to make the decisions which will guide the rest of the process.

It is also expected that the discussions raised may encourage the use of educational animation in the

context of civil construction, focusing on the target audience, the construction worker. The literature review was the strategy used to achieve the goal.

To emphasize the use of the adapted model (the proposal of this study) a material available was chosen in social networks for the transfer of specific concepts of civil construction for the workers of the construction. In this way, the Primer of Lean Construction, (educational instrument available to assist the training of the worker in construction,) will be used to put the proposed objective into practice.

2. CONTEMPORARY APPROACHES IN EDUCATION

The term "transference" has been discussed in different contexts, including education, psychology, and administration. Below, we present concepts which seek to define the theme addressed and its relation with the civil construction sector.

Broad and Newstrom (1992) define the concept of transference in training as the effective and continuous application of knowledge and skills acquired in training for the workplace, whether these inside or outside this environment.

Vygotsky (2001) believes that mental content results from the interaction between the subject and the environment. So the preference for methods that create situations which reproduce the work environment is growing.

Krugüer and Heineck (1997) conceptualize training as an improvement of skills and techniques, in view of the action of performing a task. The authors define education as the transfer of knowledge and ideas, in a perspective focused on life.

Segundo Freire (1996) and the progressive conception, teaching does not take place in one way, since teaching and learning are one and the same. Thus, those who teach also learn.

In this way, knowledge transfer occurs both in training and in education. Therefore, there is the need to know/use tools which can aid in the teaching-learning process.

This research proposes the adaptation of a reference model for the development of educational animation focused on the construction sector, with the aim of transferring knowledge to the workforce.

Alves (2016) admits that when directed towards education, animation needs to add some extra elements related to the learning process, so it is necessary not only to design an animation or a story, but also to consider the context, the learning processes involved, the public and the learner's learning.

The following are some concepts brought to increase understanding of the subject matter.

2.1. Animation

Animation can be described as the art of capturing a series of individual and continuous positions that when played in rapid succession convey the illusion of

motion. It can be used as educational material, contributing to the educational process. (Patmore 2003). Animations can empower, facilitate and engage the learner in learning situations (Ainsworth 2008).

Vygotsky (2001) states that cognition originates in motivation, but according to the author it is not born spontaneously, it requires stimulation.

In this context, Gondim et. Al. (2011) state that the use of animation stimulates cognitive processes, such as perception, memory, language, thought and others, as well as producing a playful environment for the development of learning.

The authors state that animation allows the modeling of real events that temporarily evolve into abstract concepts. They draw attention to the interaction between user and system, achieved through the use of animation, since it is culturally perceived as a little formal language.

Huhnt et. al. (2010) believe that the basic mission of animation is to transmit knowledge, so the learner can use the teaching where the application was planned.

Xiangyu et.al. (2013) reveal that animation is one of the media options used to produce Augmented Reality (RA). Although it is not the focus of this study, it is important to emphasize that the discussions about the use of Virtual Reality (RV) In built environments have been growing in researches in the field of architecture, engineering, construction and other related to assist in matters such as planning, design, security and training of risk operations, among others.

It is important to mention characteristics which differ from the commercial animation of the animation developed with the educational approach. The following item conceptualizes the animation in this last approach.

2.2. Educational Animation

Lowe et. Al. (2008) affirm that animation consists of forms or elements which change in relation to time, in a sequential and continuous way.

Barbosa Júnior (2005) describes animation as art which depends on technology, and thus relies on the resources of visual syntax, as well as drawing and painting, but which aggregates audiovisual elements. Therefore, it becomes "a multimedia art" which has the ability to tell stories and convey information.

Alves (2012) clarifies that the production of commercial animations counts on specialized professionals for each aspect of the production (narrative, script, illustration, animation), however, this does not always happen with the teams of development of educational animations.

The author alerts that in many cases in the design of educational animations, decisions are focused on the presentation of content, based on the subjective knowledge and experience of the author responsible for the project (animator, teacher or animation team and editing). In this way, the process becomes variable and depends on the repertoires of the developers, and these are not always able to do so.

Barbosa Júnior (2005) briefly points out four phases for the generation of commercial animations: 1) design and

development; 2) pre-production; 3) production and 4) post-production.

The first and second phases of the process are characterized by the development of the story to be told. Thus, story, requirements, goals, and graphic choices are defined at that time. The third and fourth are responsible for executing the planned decisions, the production.

In the same way as in the chosen reference model, after reviewing the literature, this article focuses on the first phase of the animation production process. This phase is responsible for the decisions which will guide the rest of the process.

In this context, a survey of the existing knowledge about the narrative construction, the script and a restructuring of the design process is relevant, in order to guide it to meet the expectations of the learners.

3. ELEMENTS OF THE SCRIPT

Clark and Lyons (2011) believe that learning occurs when new content is processed by working memory and then integrated into the learner's long-term memory.

Alves (2016) emphasizes the importance of information organization and also the use of narrative structures for learning. It completes the argument by stating that in learning the use of narrative can aid in memorization and empathy.

The literature review points out as relevant the use of the model developed in Alves' research (2016) as a reference for the development of educational animation for the construction workers, proposed in this article.

The reference model chose to study more language-related authors, cinematographic production and the making of scripts, considering them closer to the object of study, the animations.

Table 1, below, presents the selected elements after comparison with the authors suggested in the literature, according to Alves (2016). They are: Gancho (2002), Field (2001), Comparato (1995), Maciel (2003), Seger (2007), Mckee (2006) and Vogler (2006). The elements highlighted by the authors are: theme, subject, message, space, time, action, structure, character, scene, cohesion and narrator.

Table 1: Selection of script elements

Elements	Definition	Authors
Theme	Idea in which the story is written around	Gancho(2002); Maciel (2003); Seger (2007); Mckee (2006)
Subject	Fulfillment of the theme	Gancho(2002); Field (2001); Comparato (1995)
Message	Thought or conclusion to be drawn from the story	Gancho(2002);
Space	Determining the place and environment of the story	Gancho(2002)
Time	Period of the event	Gancho(2002); Comparato (1995)
Action	Structure of the events and ongoing which will construct the scenes	Field (2001); Comparato (1995)

Structure	Set of shapes or elements which compose the script	Gancho(2002); Field (2001); Maciel (2003); Seger (2007); Mckee (2006)
Character	Beings active or not, present in the story, not necessarily human.	Gancho(2002); Field (2001); Comparato (1995) Maciel (2003); Seger (2007); Mckee (2006)
Scene	An event of the story which presents the action with the conflict	Field (2001); Maciel (2003); Seger (2007); Mckee (2006)
Cohesion	Form of writing and elements which make the narrative attractive	Seger (2007)
Narrator	Character or being that tells the story	Gancho(2002)

From the description of the elements listed, the reference model presents a structure for the narrative construction in educational animations, as represented in Figure 1, below.

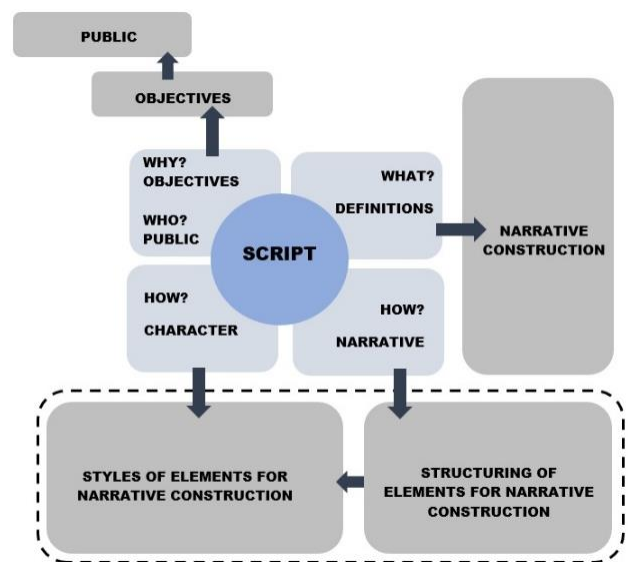


Figure 1: Structure for the construction of narrative in educational animations

Source: adapted from Alves 2016.

4. STRUCTURE FOR THE NARRATIVE CONSTRUCTION IN EDUCATIONAL ANIMATIONS

From the study of the structure for the narrative construction in educational animations, developed by the reference model addressed, an adaptation was elaborated to aid the transfer of the knowledge for the civil construction workers.

The Lean Construction Primer was chosen to exemplify the adapted model.

The items below present the elements defined by the reference model and that will be used to produce the proposed model. It is important to point out that the

elements were reorganized by modules in order to facilitate visualization at the time of structuring the representation. In this way, the content is presented in three modules, according to its purpose: narrative construction, structuring of the elements for the narrative construction and styles of the elements for the narrative construction.

4.1. Narrative construction

The narrative construction according to the reference model contains six elements for the definition of the presented module. They are: theme, subject, message, space, time and action. Table 2, below, presents the elements for the construction of narrative in educational animation.

Table 2: Narrative construction - reference model

Theme	Subject	Message
What is the story about?	How does the theme appear and develop?	What is the conclusion to be drawn from the story?
Component elements: - Premise; - Governing Idea and - Problem.	Component elements: - Research on the subject (personal memories, imagination about the content and facts that occurred); - Fact / event; and- - General and detailed view of the subject.	Component elements: - Story - Objectives; - Their personal interest and - Outcome.
Space	Time	Action
Where? (Place / setting of the story)	What is the time of the event?	Structure of the events and events which will form the scenes
Component elements: - Place / location and - Environment (socioeconomic, moral and psychological).	Component elements: - Period - Duration - how long? What is the time used for ?; - Chronological / psychological time; - Linear Time; and - Nonlinear time.	Component elements: - Physical action (character movement); - Emotional action (internal to the character); and When and how the facts will happen.

4.2. Structuring of elements for narrative construction

The structure of the elements for the narrative construction, according to the reference model, contains three elements for the definition of the presented module. They are: structure, character and scenes. Table 3, below, presents the structuring of the elements for the narrative construction in educational animation.

Table 3: Structuring of the elements for the narrative construction - reference model

Structure	
Definition: Set of shapes or elements which compose the script, selecting events from the life story of the characters composed in a strategic sequence to stimulate specific emotions.	Component elements: - Plot - Acts; - Conflict; - Turning point; - Evolution of the story; - Climax; - Secondary plots; and - Others (unfolding of the items mentioned above)
Character	
Definition: Beings active or not, present in the story, not necessarily human.	Component elements: - Role (who is the character? Protagonist / supporting ... others); - Function in the plot; - Type of character; - Needs; - Characteristics; - Level of veracity; - Motivations of the character; - Evolution; - Applied archetypal structure; and - Conflicts.
Scenes	
Definition: An event of the story which presents the action with the conflict, in more or less continuous time.	Component elements: - Objects - specific unit, an action in a given context. - Events: action and reaction; - Composition of speeches - dialogue and point of view; - Texts and subtexts contained in the action; - Visual composition - movement and actions in time; - Size: beginning and end of an event; - Types of camera shots and angles; - Rubrics: everything that is not dialogue: scenarios and environments; -Indexes: clues to the audience, insinuations; - Sequencing of scenes; and - Dramatic scenes: activities, dialogue and language.

4.3. Styles of elements for narrative construction

The styles of the elements for the narrative construction according to the reference model, contains two elements for the definition of the presented module. They are: cohesion and narrator.

Table 4, below, presents the style of the elements for the narrative construction in educational animation.

Table 4: Style of elements for narrative construction - reference model

Cohesion	
Definition: Form of writing and elements which make the narrative attractive.	Component elements: - Anticipation of the outcome: tips that are coming to an achievement; - Recurring themes: image, rhythm or sound which are repeated throughout the film;

	<ul style="list-style-type: none"> - Repetition: attributes to confirm a characteristic; - Contrasts: opposites increase the dramaticity; - Unity: vision of the whole and the parts; - Elements to success: appeal, creativity, structure of the script; - Connection: universal appeal, trends, needs and reasons; and - Clarity: Theme and connections to the theme.
Narrator	
Definition: Character or being that tells the story	Component elements: - Type: Third person (omniscience / omnipresence) First person (witness and protagonist).

After the study of the structure for the narrative construction in educational animation, developed by the reference model, it was possible to elaborate a model to help the transfer of knowledge to construction workers. The following item presents the proposal of this research, taking into account aspects relevant to the adequacy of the reference model used for the civil construction sector.

5. PROPOSAL - EDUCATIONAL ANIMATION ADAPTED TO CIVIL CONSTRUCTION

The literature review allowed choosing the model which after the study of the elements of the narrative, proposed a structure for the narrative construction in educational animations. The reference model used was obtained from Alves (2016). The choice was made for clarity, pertinence and proximity to the theme of this article. After the brief explanation of the elements of the narrative, expressed in the modules presented previously, some points will be considered in order to conduct the production process in educational animation.

5.1. Relevant considerations to educational animation production

This research chose to focus on the first phase of the animation production process, since it is in the initial texts that the content is conceived and the decisions which guide the rest of the process are made. It is necessary to consider the interdisciplinary work for the construction of the animation, thus, a team composed of professionals from different areas can be part of the creation process. The adaptation of the reference model it was possible after consideration of the aforementioned considerations, including the analysis of the context. The context covered is the construction sector and the target public is the construction worker. After analyzing the data disclosed by Annual Social Information Report – RAIS/TEM (2014) it was possible to affirm that the age range of the construction worker is concentrated in the range of 25 to 39 years and that this number corresponds to a total of 51.78% of the total workers.

The analysis also reveals that in Brazil, the construction worker is predominantly male and has monthly incomes in the range of up to two minimum wages. The data indicate that the turnover rate is high, since approximately 50% remain for up to two years in the same company.

The brief discussion about the context and the target audience was intended to characterize the universe considered for the development of the one proposed by the research. Basically, it served as support for the necessary premises for the accomplishment of educational animation directed to the civil construction. The following item presents the proposal adapted to the civil construction, based on the reference model.

5.2. Adaptation of the reference model for educational animation in civil construction

The Civil Construction Primer was developed during Santana (2010) dissertation research and aimed to present and encourage construction workers to perform good practices related to lean construction in the work environment; the construction site. The material was presented in A5 format, printed and colored. Simple texts with easy assimilation. The practices highlighted are usually taken from the daily routine of the worker to facilitate understanding. Figure 2, below, illustrates the Civil Construction Primer.



Figure 2: Lean Construction Primer
Source: Santana 2010.

The material studied was not designed for the development of educational animation. However, it can be used to exemplify the proposal developed in this article, adaptation of educational animation for construction workers.

It is important to emphasize that the proposal covers the first stage of the animation which provides the guiding definitions for the implementation of the product. The next phases can be achieved with the help of professionals of the area, who will transform the information (static images and texts) in dynamic graphic, with movement.

Table 5, below, describes the module for the narrative construction, according to the reference model. It contains six elements for the definition of the module presented. They are: theme, subject, message, space, time and action.

Table 5: Narrative construction – proposal

Theme	Subject	Message
What is the story about?	How does the theme appear and develop?	What is the conclusion to be drawn from the story?
The story relates the day to day construction worker and his daily actions at the construction site.	At each scene, it is possible to focus on the action of the worker who consciously performs it (whether in the execution of a task, in the use of a work tool, in the exchange of experience with a colleague, among others).	It is possible to carry out actions directed to the principles of lean construction in the day to day work.
Space	Time	Action
Where? (Place / environment of the story)	What is the time of the event?	Structure of the events and events that will form the scenes
The scenario is a common day on a construction site.	The story takes place in the present day. Corresponds to a work day, which usually starts at 7am and ends at 5pm at the construction site.	The physical action will be expressed by the correct execution of each service, considering the studies of the ergonomics for the accomplishment of the same ones. Emotional action describes a positive, constantly motivated character to learn.

The module directed to the narrative construction, presents an overview of the theme, including the space and the time where the scenes will take place, in this case, the construction site.

Table 6, below, describes the module for structuring the elements for the narrative construction, according to the reference model. It contains three elements for the displayed module definition. They are: structure, character and scenes.

Structuring the elements for the narrative construction - proposal

Structure	
Definition: Set of shapes or elements which compose the script, selecting events from the life story of the characters composed in a strategic sequence to stimulate specific emotions.	
Plot	How to use good practices to solve the issues arising from the day-to-day construction site, using the basics of lean construction. The worker is aware of his actions and seeks to carry out good practices in the work environment.
Acts	The questioning towards the current action and the one considered satisfactory for a given procedure.
Conflict	What can I do to improve what I already do? What are the consecrated practices I should follow?
Turning Point	New knowledge to carry out good practices.
Evolution of the	The worker knows and puts into practice

story	what he has learned.
Climax	The worker feels accomplished by practicing the action / thought which made his work even better.
Secondary scenarios	The worker transmits to his colleagues the new learning.
Others (unfolding of the items mentioned above)	The worker is recognized for his performance in the service performed or attitude which has contributed to the improvement of processes in the workplace.
Character	
Definition: Beings active or not, present in the story, not necessarily human..	
Role	Miguelito - Worker (Protagonist) Master of works (Supporting role) Coworker (supporting role)
Function in the plot	The main character, the construction worker is active in the plot.
Type of character	The main character is the caricature of a middle-aged workman.
Needs	The character wants to know the best way to perform the services which are assigned to him, as well as to know the most appropriate tools to execute them.
Characteristics	
Level of veracity	The scenes depict real situations of the day-to-day construction site, however do not stick to the representation of the complementary scenario, but only what is necessary for the transmission of the main message of the story
Motivations of the character	The character is motivated by his daily learning because he understands that he is the first client of the process. He also knows that good practices generate continuous improvement.
Evolution	There was no significant evolution in the actions of the main character
Applied archetypal structure	Middle-aged man with habits coming from a traditional education
Conflicts	How to maintain healthy relationships in the workplace. How to find ways to grow in the work environment.
Scenes	
Definition: An event of the story which presents the action with the conflict, in more or less continuous time.	
Objects	The tools and the specific scenario of each service at the construction site.
Events	What generates each action carried out in practice, day by day, at the construction site
Composition of speeches	The lines almost do not exist, the expressions depict the message that the character wants to convey.
Texts and subtexts	The texts portray the actions considered good practices to be conducted at the construction site.
Visual composition	The scenario is simple. It was chosen to portray only the necessary, to convey the main message of the scene.
Size	The events are fast, have a short duration of time, as they portray the daily life and emphasize what is already done and leads to continuous improvements.

Types of camera shots and angles	To be defined with the responsible team.
Rubrics	To be defined with the responsible team.
Indexes	Use already usual terms of the working environment (slang or audience's own staff)
Sequencing of scenes	The scenes were divided according to the principle of lean construction which was presented.
Dramatic scenes	Some scenes were exaggerated to attract the attention of the target audience.

The module directed to the structuring of the elements of the narrative discussed the structure, the characters and the scenes. It is important to emphasize that the reference model presents elements that, in some cases, may be repetitive according to the level of complexity to describe the story that it is to be told.

Table 7, below, describes the module for styles of elements for the narrative construction, according to the reference model. It contains two elements for the displayed module definition. They are: cohesion and narrator.

Table 7: Style of the elements for the narrative construction - proposal

Cohesion	
Definition: Form of writing and elements which make the narrative attractive.	
Anticipation of the outcome	It was not present in this work
Recurring themes	The construction site scenario (sidings, tools, building materials, signage, EPIs ... among others)
Repetition	Repetition of the main character using the uniform and tools needed for each service
Contrasts	Some drawings were rendered out of the usual pattern, in order to draw attention to the main message of the scene.
Unity	The repetitions already cited, in the scenarios, promoted the unity of the parties.
Elements to success	The casual approach and short, simple language have come together to convey the main message of the story.
Connection	The verisimilitude between story told and reality, bring the target audience closer to the developed product, generating empathy.
Clarity	Short phrases, images focused on the representation of necessary objects were the combination chosen to attribute clarity to scenes
Narrator	
Definition: Character or being that tells the story	
Type	Selective omniscient narrator (third person): narrates the facts always with the concern to report opinions, thoughts and impressions of one or more characters.

The module directed to the style of the elements for the narrative construction presents the form of writing and elements that make the narrative attractive. It also presents the narrator, character or being that tells the story. In the case presented, the main character is the construction worker.

The following item shows the application of the proposal in the context of civil construction after the use

of narrative structure adapted for educational animation, as presented in the previous item.

5.3. Application of the proposal: Lean Construction Primer

The base of the reference module helped to organize the elements by purpose, which allowed to visualize the whole process, which in turn can facilitate the structuring of the representation of an educational animation.

The Lean Construction Primer did not emerge from a narrative structure for the development of educational animation. However, the use of the model proposed by this study eased the understanding of the narrative exposed, making more transparent the objectives which could be intrinsic only to the author/developer's desire for this material. Thus, he was able to reduce his subjective manner of the material.



It is worth mentioning that, in addition to the principles of lean construction in practice, it was also prioritized to review and / or encourage the correct use of work tools, materials available in the work and concepts related to cleaning and organization of work environment (5S Program).







The search for practical examples that could be inserted in the day to day of the worker related to the principles of lean construction was one of the desires for the elaboration of the chosen material. It was due to exemplify the proposed model adapted for the civil construction.

Briefly, the structure of the narrative prepared for the Civil Construction Primer, if the animation production stages are completed, may contribute to: 1) Dynamize, and make the learning process more playful; 2) Review the content required for the specified services (procedures, equipment, tools and materials); 3) Streamline the process of assimilating the steps in each service; 4) Ease the understanding of the processes from the realistic exposition of the facts brought by the animation; 5) Make the overall process more transparent by exposing the relevant information; 6) Value the workspace and interpersonal relationships; 7) Encourage the use of IPE, safety equipment; and 8) Reinforce the policy of good practices and the participation of decisions in the company, suggesting something that adds value to the process, among others.

Table 8, below, illustrates some principles of lean construction and good practices related to the day-to-day construction site.

Table 8: Lean construction principles and practices tips for the construction site

Reduce the amount of activities which do not add value	
	
Suggest to your superior the use of some tool or equipment which will speed up the work.	Transport only the material necessary for the execution.
Increase the value of the product/service from internal/external customer considerations	

	
Clarify any doubts of a customer-modified project.	Do not delay the schedule of activities since the client expects to receive your property within the stipulated time.
Introduce continuous process improvements	
	
Participate in the training offered by the company.	Help to improve the company, give suggestions.
Reduce variability	
	
Use the tools you need to get quality service.	Do not use materials outside the standard.

6. FINAL REMARKS

Training in civil construction is still an issue in constant discussion. According to data from RAIS/TEM (2014), the level of education in this sector is considered inferior when compared to the productive sector.

The search for contemporary languages for learning is recurrent in several areas. The use of narrative in education can help the process to entertain, motivate and facilitate learning. The review of correlated literature states that its importance may be associated with cognitive, motivational and memory-appealing processes.

The reference model was useful for the development of the structure directed to the construction of narrative for educational animation, directed to the construction workers.

The organization of the elements in modules allowed the visualization of the whole process, which facilitated structure the representation. Thus, three modules are generated, according to their purpose: narrative construction, structuring of the elements for narrative construction and styles of the elements for narrative construction.

The Lean Construction Primer, selected from the literature to exemplify the proposal of this research, used the proposed model as a parameter to develop the educational animation aimed at construction workers. The set of recommendations of the reference module were sufficient to assist in the narrative construction.

It was noticed that the knowledge of the elements of the narrative, brought by the reference model, allowed a more structured approach to the Lean Construction Primer. Thus, the elements which make up its structure could be visualized and analyzed from a deeper insight

into the development of narrative for the educational purpose.

In this way, knowledge about the narrative elements is valid, since they can improve the construction of educational animations, when used consistently and clearly.

It is important to point out that the systematization of some elements and narrative concepts in the proposed scheme can provide clarity in the processes and ease the application of these elements, even though by non-specialized teams of authors/developers or by the teachers themselves.

Educational animation, a contemporary auxiliary language to the traditional teaching exposed in this article, is not intended to remedy the shortcomings of the civil construction sector, given the need for training, but only to complement existing methods.

It is expected that this research may encourage the discussion and the use of educational animation in the civil construction sector, since such a resource may help teaching, while motivating and involving the learner.

Thus, as the reference model was useful to guide the elaboration of the model proposed by the research, it is expected that the results of this study may also help other authors/developers of varied areas in the process of construction of educational animation.

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