

Podcasts in the Chemistry Teaching

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Abstract: Information and Communication Technologies (ICT) provide facilities in teaching through education. There are many new tools and methodologies that use ICT as a knowledge-building support, but that are not always related to pedagogical practice. The Podcast is an important technology that can be used in the classroom. Using this tool, it can make the most interactive chemistry class, fleeing the classroom routine. However, it is necessary to point out that the podcast is just one feature that should be incorporated into education and not a substitute. This paper describes the development of Chemistry Podcasts by teachers and chemistry students in three disciplines in 2015. This study took place over a one-year period in a public University, in Pernambuco, Brazil. In the discipline of "Computer applied to the teaching of chemistry" participated 21 Chemistry teachers. In the disciplines of "Information and Communication Technologies in the teaching of chemistry" and "Informatics, Chemistry and Education" was composed of 54 undergraduate students in chemistry. Twelve podcasts were elaborated by students and five by teachers in this paper we present only nine. The results showed the contribution of podcasts produced by teachers and students in teaching and learning process chemistry.

Keywords: chemistry teaching; didactic resources; ICT; podcast; teaching and learning

1. INTRODUCTION

The impact of Information and Communication Technologies (ICT) in education is, in fact, a particular aspect of a much wider phenomenon, related to the role of these technologies in today's society. Many stakeholders in society devote their time to continuous improvements in education, particularly through use of ICT. Previous research has highlighted a wide range of approaches in order to make these improvements [1-8].

It is important to consider that ICTs are tools should be used as a mediator in the process of teaching and learning cannot be considered decisive in the construction of knowledge by students. When we use the media, we are using their language, and that this is the basis of the process of knowing [7]. According Ferrés [9] when using different means, not only to learn in different ways and to produce distinct learning. Among all the technologies created by human beings, those related to the ability to represent and transmit information - that is, information and communication technologies - is clothed with a special importance, because they affect almost all of

those activity areas, since the forms and practices of social organization to the way of understanding the world, to organize this understanding to transmit it to others. ICT has always, in their different stages of development tools to think, learn, understand, represent and transmit to other people and other generations acquired knowledge [10]. We live in an era of a technological-scientific revolution that is relevant for all of us – the era of Web 2.0. Web 2.0 represents a conceptual change in the way contents are built in the internet and the way people utilise these contents. In 2005, a new technological tool was announced by the editors of the New Oxford American Dictionary as the word of the year: podcasting [11]. Although the current literature identifies a long list of possible fields where the Podcast (term currently used) can be applied, we focus on the use of Podcast on education, which received special attention over the past few years.

The term "Podcast" has emerged as the acronym of the words "public on demand" and "broadcast" [12, 13]. Podcasts are also available from scientific organizations, such as the Royal Society of

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Chemistry and the Nature Publishing Group [14, 15]. Meng [16] defines podcast as “the process of capturing an audio event, song, speech, or mix of sounds and then posting that digital sound object to a web site or blog in a data structure called an RSS 2.0 envelope (or feed). Using specialized news readers, users can subscribe to a web page containing RSS 2.0 tagged audio files on designated web pages and automatically download these files directly into an audio management program on their personal computer. When a user synchronizes their portable audio device with their personal computer, the podcasts are automatically transferred to that device to be listened to at the time and location most convenient for the user”. However, nowadays there are new kinds of podcasts: audio podcast, enhanced podcasts and video podcasts. When the podcast is inserted in audio, termed audiocast [17, 18] does not require visual attention. Audiocast it is one of the types used in education, where lessons can be recorded, pleasing those who could not attend the same and contribute to students who wished to review the lessons to complete your notes. The enhanced podcast is similar to traditional podcasts [19]; however, this kind of podcast contains multimedia information, such as slides, pictures, images, photographs, short videos, and chapters that help users to increase their perception about the topic. Video Podcast, called vodcast by Salmon and Edirisingha [19] and vidcast by Newbutt, Flynn and Penwill [20], is one of the latest innovations in the podcast world where it exchanges the audio of traditional podcasts for video. According to Blonder et al. [21] “throughout the twentieth century, movies on chemistry have been used in many ways in chemistry education” and currently the podcast has been highlighted in the twenty-first century. What differs Podcast any other audiovisual material is the way they are published and shared.

Podcast can be classified into six dimensions: format (audiocast, vodcast, Enhanced podcast, screencast), type (expository, feedback, instructional, metaphor, educational, etc.), duration (short, moderate and long) author, style (formal and informal) and purpose (Inform, Motivate, Challenge, Explaining, raise awareness, encourage to question, analyze, summarize, reflect, etc.).

In chemistry teaching, we found some podcasts. Leite, Leão and Andrade [22] discuss the elaboration of a vodcast on electrolytic cells. Schaffhauser [23] highlights High School Chemistry teachers using vodcasts to form the root of a new

learning model. Research by Powell and Mason [6] focused in three areas: the extent of podcast usage, the numbers and types of interactions between instructors and student laboratory teams, and student performance on graded assignments in the chemistry teaching. O'Malley [24] describes innovative use of a Tablet PC and screencast in delivering chemistry lectures. Bartle, Longnecker and Pegrum [25] asks about "creating Podcasts to be useful assignment in a large undergraduate chemistry class?", where preliminary results encourage the authors to recommend similar assignments in other large, introductory science classes as a means of developing graduate attributes while maintaining development of content knowledge.

In this paper, we highlight the development of Podcasts by:

- ✓ Teachers of primary and secondary private and public schools during the course of "Applied Informatics the Chemistry Teaching" in the Specialization Course in Chemistry Teaching;
- ✓ Degree students in chemistry, in the discipline of "Information and Communication Technologies in Chemistry Teaching" in the course of degree in chemistry at the Rural Federal University of Pernambuco here called "University A", and;
- ✓ Degree students in chemistry, in the discipline "Informatics, Chemistry and Education" in the course of degree in chemistry from the Academic Unit of Serra Talhada of the Rural Federal University of Pernambuco here called "University "B".

To accomplish this, we analyze the creation of Podcasts chemistry.

2. METHODOLOGY

The development of this research followed the molds of a qualitative research, through a case study, in order to understand the process of elaboration of podcast. The relevant processes for the preparation of the Chemistry Podcasts were analyzed. Considering the preparation of Podcasts “Hydrogen peroxide, Alcohol effects, Ice density, Acidity Stomach,

Breathalyzer test, It's Hot? Then it will rain, Why is it wrong to talk 'Today's hot?', Acid-base indicator, and Solubility of gases in water “, indicator acid-base and solubility of gases in water”, as well as the assessment tools used in this research. To prepare the Podcast you need to go through some stages, namely:

- ✓ Pre-production that included planning the theme addressed, the objectives that are sought him, directing the Podcast for his purpose in teaching.
- ✓ The production with the completion of work by separating the necessary materials, digital cameras or camera phones or digital cameras, microphones, a computer with basic configuration and free software that enables the editorial stage.
- ✓ The post-production with his edition, using appropriate files, your publication using an aggregator, the generation of an RSS file (Really Simple Syndication). This RSS file lists the location of the Podcast, also includes information on the Podcast, when it was published and the description of it. The RSS audio-video file is posted to a network server.

The preparation of Chemistry Podcasts was performed by: teachers in the Specialization Chemistry Course in discipline “Informatics applied to Chemistry Teaching”. The class consists of 21 teachers, 13 of these teach only in private schools and 4 are exclusive to public education and other 4 classes are taught both in public schools and in private schools. We have 15 teachers act only in high school and 6 teachers teach in Primary Education II (9th grade) and high school; by 23 undergraduate chemistry students from the university A in the discipline "Information and Communication Technologies in Teaching of Chemistry" and 31 undergraduate chemistry students from the university B in the discipline "Informatics, Chemistry and Education". In total twelve podcasts were elaborated by students and five by teachers, in this paper we present only nine podcast.

Concerning to the produced podcasts three times during the pre-production, production and post-production were observed for discipline:

I. Theoretical discussions Podcasts in

Chemistry Teaching: existing Podcasts geared to the Teaching of Chemistry were highlighted, observing the main characteristics of these Podcasts. Observation of the most common formats on the Web publications. These and other factors allowed participants to properly substantiate the production of a Podcast Chemistry;

II. Elaboration of Podcasts: The participants formed groups and started preparing the Podcast by following the steps described below: (a) choose of theme, (b) Script elaboration containing the description of the images/sounds that will be displayed during the Podcast, (c) podcast production with a minimum of two minutes and a maximum of five minutes, (d) editing images/sounds by appropriate software, (e) Publishing Podcast.

III. Teacher evaluation regarding the preparation of the podcast: participants answered a questionnaire in order to qualitatively analyze the development and Podcast use in chemistry class. The questionnaire aimed to reveal the opinion of each participant on the elaborate Podcast. Thus, we see the difficulties and advantages to develop and use the Podcast in pedagogical practice. For it was prepared eight questions with emphasis: production Podcast, objective of Podcast produced, if this goal was achieved, the difficulties both in the preparation of the Podcast script as in the production. What is the opinion about the use of the Podcast in its teaching, its assessment and the improvements that can provide Podcast and ultimately a space for participants to leave their comments on the activity.

The categorization of responses was based on Creswell's proposal [26] involving unstructured and generally open questions, which are small in number and are intended to raise the participants' conceptions and opinions.

3. RESULTS AND DISCUSSION

First, the study results suggest that the Podcast is a powerful tool as a complement to traditional teaching resources, but we cannot consider as a substitute for them. According to the participants, Podcasts, as well as other teaching materials, must be combined to aid in learning. The responses of subjective questionnaire were presented as written by the participants, preserving typing errors, text writing errors, etc. moreover, the names were removed and data which might identify subjects. The questionnaire (Figure 1) was built through Google Docs, using the tool to create form subsequently provided the link to the participants.

The screenshot shows a Google Forms questionnaire titled "Elaboração de um podcast". The form includes the following fields:

- Title: **Elaboração de um podcast**
- Subtitle: **Pequeno relatório sobre os Podcasts produzidos.**
- Text: ***Obrigatório**
- Text input: **Nome Completo ***
- Dropdown menu: **Em qual dos Podcasts você participou? *** (Selected: **Efeitos do Álcool**)
- Text area: **O que você achou do podcast produzido? ***
- Text area: **Qual foi o objetivo inicial de seu Podcast? ***
- Text area: **Os objetivos do Podcast foram alcançados? ***

Figure 1. Online questionnaire about the elaboration of Podcast.

The following are the podcasts prepared by teachers and then prepared by the students. All participants produced the Podcasts with own resources and follow the steps provided by discipline teacher.

Podcasts produced by teachers

The Podcast called "Hydrogen Peroxide" (Figure 2), whose main theme question the effervescence observed when hydrogen peroxide (oxygenated water) is used in cleaning the wounds. It's a podcast of type vodcast/vidcast [19, 20]. The podcast lasts two minutes has been prepared to explain the reasons for which the peroxide is used, questioning several people about the observed phenomenon. In a second step, one of the teachers shows an example of what occurs with the use of hydrogen peroxide in injury, using a raw liver, elucidating on the presented fact.

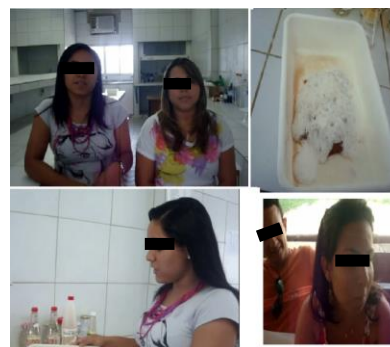


Figure 2. Images Podcast Hydrogen Peroxide.

About the Podcast goals ("The objectives of the Podcast been achieved?") All participating teachers preparing the Podcast said "yes." When asked about the podcast ("What did you think of Podcast?") of these teachers says: "I found it interesting because it distracts a little school always in the room". As concerns the difficulties presented to prepare the script these teachers pointed out that the choice should be everyday issues ("What difficulties encountered in preparing the script for the podcast?"): "We think the podcast script was simple, everyone was familiar with", "to make the podcast made the script so that our students knew the content". As regards to the difficulties of preparing the Podcast ("What are the difficulties found in the preparation of the Podcast?") one of the teachers revealed that shyness was the biggest barrier to preparing the Podcast: "I had a lot of shame in doing the podcast, then helped the script only. I know that as a teacher should not be ashamed". These teachers use the camera phone to carry out the Podcast and from the teachers to answer the questionnaire on a review podcast ("What is your evaluation of the Podcast?") affirmed "it was to use a digital camera with better quality because with the camera used, the sound and image were not good". We note that at this point the teacher recounts his experience when using the Podcast and it's important to be aware of the material used, to infer that the quality of the Podcast was not better because of the phone's camera can be misleading, as there are mobiles with similar resolutions of digital cameras, perhaps to prepare this Podcast teachers were not careful with the camera positions, i.e., the angles so that the images would not become blurred (as noted initially) and open spaces which damaged the Podcast audio. In the edition using Windows Movie Maker® program. About the edition, Schaffhauser describes that teachers used the Camtasia Studio to make vodcasts of chemistry [23]. The editing is an important part in the elaboration of

podcasts, so it is recommended that in this step the program allows the use of several resources, providing good quality in the final podcast.

About Podcast leading to the theme: "Alcohol effects" (Figure 3) its main theme a contextualized approach to alcohol consumption. Displaying the result of the use of alcohol in the person's body and the danger they can cause to society, with three minutes duration and thirty seconds. The scenario is divided into three parts: the first part describes when a young drunk is with some people on the street that prevents you from driving your car. The second part highlights the young, wise this time, thanking people who kept him from driving drunk and here we can surmise the intent of these teachers in awareness about driving and drinking. The last part showed the time when this young man is led to a reflection on the intake of the drink, commenting on the effects that alcohol causes and discreetly mentioning about the reactions that occur in the body of a drunken person.



Figure 3. Images of the Podcast.

When questioned in relation to the initial objective of the elaborate Podcast ("What was the initial goal of your Podcast?") highlight the response of a participating teacher of the group: "Display the possible reactions caused by alcohol and its interference in the social sphere". With regard to the Podcast goals ("The objectives of the Podcast been achieved?") one of the teachers reveals his addiction to alcoholic beverages, leading us to assume that the development of this Podcast by this teacher had an extra motivation, maybe one emotional relationship. How script development of difficulty ("What difficulties encountered in implementing the roadmap for the Podcast?"), among the responses of teachers who developed this Podcast, we mentioned one below: "Of not losing focus on the goal and the preparation of arguments". In addition to this

difficulty presented, when asked "What are the difficulties in elaboration of the Podcast?" One of the participating teachers in the group said "... It was actually a part of the production of arguments related to the topic and relate everything in the video with the members". When asked "What is your opinion for the use of the Podcast in his class?" highlight one of the answers of the group of teachers that says: "I think the Podcast a well-cognitive activity and facilitates learning. Too bad the use Podcast in my classes are still scarce. Because it does not count on the aid of PC and other Internet tools such as for example in school". In assessing the Podcast all teachers of this group said it was great. For these teachers Podcast was well used. This podcast is considered of type vodcast/vidcast [19, 20].

In relation to the Vodcast/Vidcast in which exposed the theme of "Density Ice" (Figure 4), which sought to explain why the ice "float", the podcast has four minutes and seven seconds duration. At the beginning of Podcast, one the teachers questions about the ice is floating in his glass with soda. Then make test with ice in water and again introduce the first question because the ice floats? These teachers continue the discussion on the density, with two experiments, the first with stone and water and the second highlights the experience with the egg, divided into two parts - egg and water and egg, water and salt.



Figure 4. Images Podcast Density Ice.

The second time the podcast displays the discussion of teachers on the facts observed previously. With the answer on the observed facts, one of the teachers highlights the discussion on the podcast on the density, the fact to float in seawater. When asked about the Podcast produced ("What did you think of the produced Podcast?") one of the answers of the teachers described that "Enjoyed the Podcast produced and show to my students", another

teacher of the group explained that the podcast "is a very good technological tool and intend to use it with my students". About the objectives of Podcast ("The objectives were achieved Podcast?") these teachers pointed out that yes and one of them said: "It was a wonderful experience making the video, think about talking about simply density and believe that we can", was observed in response to combination of video with the podcast. In preparing the script ("What difficulties encountered in implementing the roadmap for the Podcast?"), one of the teachers mentioned that the script was built via email: "As only we met during post of classes, we combine to make the script by email and not all gave their opinion". Through the question "What are the Difficulties in elaboration of the Podcast?", we highlight one in which the teacher says: "We had difficulty in gather. So we recorded the range of our class, at lunch". With regard to the use of the Podcast in pedagogical practice these teachers we list some answers: "It would be good that my students do", "I think it would help in the content that needed some simulation" and "The way it is presented is not equal to the classroom". On the evaluation of Podcast ("What is your evaluation of the Podcast?") one of the teachers commented that the wind messed up audio podcast: "I found it very good and interesting, but the noise was because of the wind hurt a lot and sound bar that we recorded". We think that in the coming productions of this teacher, there will be a care as to where the recording of the podcast, so that the wind does not disturb recording hindering their understanding. Regarding improvements in learning, teachers is based on the idea that "the Podcast is an Internet tool that helps in learning", "When did the script must organize and verify the information that would be written" and "to be easy to do the podcast motivates and that learning is high". Teacher feedback has been positive enough to recommend use of this type of podcast assignment in other chemistry classes.

Teachers identify some reasons for them to use Podcast: it was the first time I used this tool, which provided a different approach to teaching content in the classroom, creating its own material for the classes, according to their needs, different uses of materials in the classroom can provide advantages for teaching chemistry. For Williams and Pence [5] perhaps the biggest test is that teachers will continually be challenged to be learners. Teachers still must be concerned with differences in motivation and ability, and the job of explaining difficult concepts will still represent a challenge. Bartle, Longnecker and Pegrum [25] identify the podcasts are as an

engaging, learner-centred task, it fitted well with contemporary pedagogical approaches.

Podcasts produced by students of University A

The Podcast "Stomach acidity" tells a story in which the character Ricardo is with his friends after going to the doctor (Figure 5) and the result of that visit to the doctor is that he's principle ulcer. This podcast is of type vodcast/vidcast [19, 20].



Figure 5. Images Podcast Stomach acidity.

Ricardo explains what ulcer to your friends, and questions are asked: What is this acidity? As happened? Ricardo says that in its organism the acid is poorly produced, reporting processes involving the ulcer principle. The Podcast consists of one minute and thirty-two seconds (short podcast) and can be used to start or contextualize a discussion of acids and bases. The ability of the student to explain chemical content, explanatory knowledge [27], is another import area to consider when determining how to effectively teach. This perhaps should not come as a major surprise at the ability of most students to knowledge new rather abstract concepts [24].

The Podcast "Breathalyzer Test" (Figure 6) discusses the operation of the breathalyzer, showing a simulation of the operation of the breathalyzer in the laboratory, explaining through chemical reactions as is identified when a person has ingested or not an alcoholic beverage.

The Vodcast/Vidcast aims allowing students to identify events of their daily lives, leading to the contextualization with the contents programmed in high school on redox reactions. The podcast showed of form humorously, some friends in a restaurant if fraternizing, this is the moment that the ICT, seeks a theme contextualization with the daily life of students,

combining the reality of society, with the introduction of the subject matter accordingly aims to promote student interest. Is reported Prohibition (which was promulgated on 20/06/2008, Law No. 11.705 of the Civil Code Brazil) with the objective of reduce accidents caused by drunk drivers in Brazil, toughening punishment against those who drink before you get behind the wheel. The Podcast showed questions about alcohol intake, the police action, the chemical operation, describing the oxidation of ethanol by potassium dichromate in acid (or even potassium permanganate in acid) that was the standard method of analysis for the determination of alcohol in expired air by the lungs. They are still used disposable breathalyzers, to explain and display the student's chemical operation of the breathalyzer. For a discussion in the classroom, it is interesting to simulate the whole 'drunk breathalyzer' based on the chemical reaction, as was illustrated in the Podcast, trying to help the teacher, showing aspects of redox reactions, which is of interest to students high school.



Figure 6. Scenes Podcast Breathalyzer Test.

Finally, the Podcast "It's Hot? Then it will rain" (Figure 7) shows a discussion of the popular wisdom, which says: when it's hot or "Stuffy" means it will rain.



Figure 7. Enhanced Podcast It's hot? Then it will rain.

This podcast is known as Enhanced podcast because it presents combination of images and voiceover that complements what is being visually presented [19, 20]. In the podcast various information and discussions about the phenomenon appears. Two friends meet and question about the popular wisdom. In the school, they question the teacher about phenomenon, which features discussions on change of physical state, latent heat, condensation of water, energy release, and agitation of the molecules, among others. According Morales Bueno [28] research, reasoning and reflection facilitate conscious and meaningful involvement of students in their learning process. The pedagogical implication of this is that students will utilize explanation types with which they are most familiar and support their existing lexicon [29]. To O'Malley [24] what is attractive to most students about the screencasts is the ability to be able to pause and replay at a particularly difficult topic.

Podcasts produced by students of University B

The Podcast "Why is it wrong to talk 'Today's hot?'" discusses the misuse of the word heat (Figure 8). It's a podcast of type vodcast/vidcast [19, 20].



Figure 8. Podcast about Heat.

Heat is the production of energy, which raises the temperature because there is a great intermolecular interaction, i.e., energy is transferred from one body to another due to the temperature difference. Heat could be a form of energy associated with the motion of atoms or molecules and capable of being transmitted through solid and fluid media by conduction, through fluid media by convection, and through empty space by radiation. Students show a debate in that affirm is not correct to say that it's hot because the heat is something that is associated with the idea of power transmission and not ownership. In

the school community is common this relationship Heat/Temp and the distortion in their concepts, but it also occurs in society in general. The use of this Podcast in teaching chemistry, will facilitate the understanding about concept and would have precisely this role of lead the understanding of the differences between the concepts of heat and temperature, ideal for complementing the discussed theme.

The vodcast/vidcast "Acid-base indicator" describes an experiment using the phenolphthalein (Figure 9), his aim was to encourage questioning, explain and reflect.



Figure 9. Scenes of the Podcast about Acid-base indicator.

It is observed a brief discussion of the phenolphthalein is performed, as well as suggestions from other indicators. The use of the Podcast would be to introduce a lesson on acids and bases in a high school class, pointing out that, beyond of phenolphthalein, there other indicators, including alternative as cabbage extract and beets, to acid-base. There is a demonstration of how to remove the phenolphthalein a white outfit. Furthermore, the podcast could also be used to include in the class the PH scale leading students to understand the change of color of the indicator in question. The podcast could be presented showing a part of the beginning of class and another at the end, stopping at some moments, enabling bring new questions related to the theme, which can be answered during the class.

The podcast entitled "Solubility of gases in water" is presented in the form of dialogue between three personages, where initially two of them are sisters talk about their different taste than water (sparkling water) presents (Figure 10). The podcast is

an Enhanced Podcast [19]. The explanation is given in the podcast that because the sparkling water contains carbonic acid (H_2CO_3), reaction product, is responsible for this characteristic taste of sparkling water.



Figure 10. Scenes of the Enhanced Podcast about solubility of gases in water.

In this podcast is done a approach dissolution of gases in water and its importance to aquatic life. The teacher from an experiment using tap water, universal green indicator and a straw to blow carbon dioxide in the water, addresses the influence of carbon dioxide in changing the pH of the water, the removal of oxygen due to the dissolution limit of gases in liquids and their consequences. An example of this is the coral degradation due to increased acidity of the water because of the presence of carbon dioxide. The gas dissolved in liquid presented in the podcast is governed by Henry's Law, leading into account their applications, as in the fabrication of mineral water and other carbonated beverages, and environmental issues. According O'Malley [24], with regard to screencast, from a student learning perspective, it is clear that this technology leads to a significant gains.

It is clear that students with podcasts can access a virtual information commons that is equivalent to the holdings of a major research library. This is already changing how students learn, but what can be expected in the coming decade? The development of podcasts of chemistry in the near future seems easy to predict.

The Table 1 describes all produced podcasts, according with your kinds [17-20].

We realize that the vodcast/vidcast are the podcasts produced by most participants. No audiocast was produced. Although it is the easiest to prepare, none of the participants created this type of the podcast. These podcasts developed by the participants

were his first production. Another feature that we should highlight is that the duration of the podcasts were between 2 minutes and seven minutes, no participant has produced a long podcast (over 15 minutes).

Table 1. Information about all produced podcasts.

Podcast	Author	Type
Hydrogen peroxide	Teacher	Vodcast/Vodcast
Alcohol effects	Teacher	Vodcast/Vodcast
Ice density	Teacher	Vodcast/Vodcast
Electron-Gol	Teacher	Vodcast/Vodcast
Electrolytic cells	Teacher	Vodcast/Vodcast
Acidity Stomach	Students	Vodcast/Vodcast
Breathalyzer test	Students	Vodcast/Vodcast
It's Hot? Then it will rain	Students	Enhanced Podcast
Acids and bases compared to the Arrhenius' theory	Students	Vodcast/Vodcast
Factors that influence the rates of reactions	Students	Vodcast/Vodcast
Why is it wrong to talk 'Today's hot?'	Students	Enhanced Podcast
Acid-base indicator	Students	Vodcast/Vodcast
Solubility of gases in water	Students	Enhanced Podcast
Transfer and energy transformations	Students	Vodcast/Vodcast
Polymers	Students	Vodcast/Vodcast
Chemical Kinetics: Organic Degradation	Students	Enhanced Podcast
Influence of temperature on the rate of a reaction	Students	Vodcast/Vodcast

Finally, when asked "What improvements in learning you believe the Podcast Can Provide" all participants highlighted some principles for improving learning using the Podcast, namely:

- 1) learning using the Podcast actively is more effective than passive learning;
- 2) preparing the Podcast requires focused attention and awareness of the importance of the material to be

prepared;

- 3) learning is most effective when the class have explicit targets (mean that class of targets, in case the contents become more efficient using the podcast facing the same);
- 4) information organized in a personal way is more likely to be used;
- 5) learn how to teach using the Podcast requires practice and skill to use this tool;
- 6) Podcast interactive contributed for a good learning;
- 7) to use the Podcast you need to learn new ways of teaching.

Participants completed the space reserved for the comments. On the plus side the production of podcasts we list, based on the responses of comments from teachers:

- (I) contextualization, observed in Podcasts, aiming to everyday situations,
- (II) discussions on the content, themes were treated in a simple way,
- (III) the questions, corroborating to reflect the observed phenomenon,
- (IV) the relaxation as a way to get the attention of students who are seeing Podcast,
- (V) Experiences, simplicity of performing an experiment and registers it for, because to make in the school laboratory would be more difficult,
- (VI) motivation, way that the podcast can be produced contributes to greater motivation on the part of developers, one of the points that we can mention is the fact that teacher-author, or what we call a prosumer. A prosumer is a producer and consumer of information, this term is used very Web 2.0.

The portability of the Podcast strengthens the idea that the use of this feature is a good tool to be used in learning assistance. For participants, the possibilities Podcast be easy to find on the internet and seen anywhere, gives them a large opening for the

use of this resource in the classroom, that you can access this tool easily.

4. CONCLUSION

This paper analyzed the development of Podcasts for Chemistry Teaching by teachers and students of chemistry, evaluating some characteristics and opinions of how the Podcast can contribute to learning and the advantages of using in the classroom. From the results, we believe that this technological tool can promote good teaching practices, in accordance with researches [1, 2, 6, 30]. The preparation of Podcasts provided identify the importance of a student-teacher/author of its teaching materials, allowing it meets the needs it deems appropriate. Whole process in the preparation of Podcasts not only helped to identify the role of this tool in the process of teaching and learning, but also to point out the fact that many schools face to the use of ICT in the educational field. Possibilities that a Podcast present, we can mention in their ability to disseminate information via the Internet, strengthening and facilitating the creation of new materials for teachers.

The elaborate podcasts allow interaction, motivation, visualization of everyday situations, in a smaller period of time if they used the same experiments in a laboratory, in addition to the concepts of each theme with the understanding simple and unique way. Podcasts presented here can be easily viewed on the Internet and can be downloaded directly to your computer through various aggregators, also playing on mobile phones, MP4, iPod and other formats. We highlight some interesting questions about preparing for the Podcast Chemistry Teaching: Podcast is a powerful tool as a complement to traditional resources, but not independently of them, the characteristics of a Podcast can increase the feeling of a permanent contact between teachers and students, increasing student motivation and Podcast usage allows to respect diverse talents and forms of student learning. Podcast can be used as a teaching and research tool, in an introductory way or revision classes. Podcasts elaborated can be used at different levels of education, and/or the use of other chemical content, depending on user's use of intention (teacher or student), while allowing a greater understanding and assimilation of experienced content in the room class or the content to be addressed.

No technology is a panacea, and many of the

traditional problems associated with educating students will remain, no matter how sophisticated the podcast may become. The podcast certainly represents an example of development, and the further progress will continue to act as a stimulus and opportunity for innovative approaches to education.

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