ReadAct
Alternate Reality, Serious Games for Reading-Acting to Engage Population and Schools on Social Challenges

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Abstract: This paper presents a gamified empowerment approach to train future teachers. The approach aims to innovate teaching strategies and to provide a system which motivates players to read and to apply acquired knowledge towards actions to address social challenges within their community. The approach is supported by an alternate reality serious game called “ReadAct” which blends reading instruction with opportunities to act on social responsibility in the real world. Validation results are offered for experiments with the ReadAct approach in different but related contexts of drama reading, environmental education and introduction to computing. Results provide evidence that ReadAct motivates players (young readers) to engage themselves and to attract their schools’ and families’ communities to act on social challenges. The underlying challenges in the experiments are water conservation, urban violence and bullying at school. The paper contributes to the literature on computer-based education by indicating how a ReadAct game may turn the school community, where it is played out, into a community school with an integrated view of academics and social services.

1 INTRODUCTION

In the past, federal government have had the undisputed responsibility to resolve any serious threats to society. In cases of earthquakes, flooding, or terrorism, we still expect the state to come to the rescue, and the heads of states “to find the right tone” when they address the afflicted nation. The government acts as this managerial monopoly because it seems that in this battle, only the state has sufficient power, infrastructure, resources, and organizational authority to take the right decisions and make a real difference. In these crisis scenarios the population is mostly reduced to the role of passive spectators where ordinary people tend to sit back and observe. However, one can now read stories about well-organized groups of ordinary citizens who simply refuse to be reduced to observers and, using social media, act to address diverse problems, such as those discussed in //chicagocitizensforchange.wordpress.com.

Upon reading such stories, one may pose intelligent questions like: Could such low-threshold community networking also facilitate the intercultural integration of refugees who have fled from war zones or persecution and are now expected to find a new orientation in their host countries? Or could such spontaneous, private engagement of citizens and communities in low-cost, networking
solutions be harnessed to tackle wider, more complex social challenges - such as the spread of endemic diseases (e.g., Zika, Dengue and Yellow Fever), local water shortages, gender violence, or even racism? In the past, these societal challenges have been traditionally and mostly addressed by governments and scientists, with little engagement of the population, schools, or universities, even in places which are near and dear to populations and students within their own communities (see for example, Eggers and MacMillian, 2013). This paper attempts to provide preliminary answers to questions like these – to the second one in particular.

The approach proposed here assumes that community members have three major resources that could be put to use in dealing with a critical social scenario in their region:
1) Insider knowledge - about the scenario itself and appropriate solutions (e.g. from previous experiences of similar crises in the same region);
2) Energy for social activity - to help solve problems (when they or their communities are afflicted themselves); and,
3) Large numbers of flexible actors who could be fielded to alleviate symptoms or implement solutions - as compared to government agents who get paid by the hours and are subject to their strict work regulations.

However, in spite of the magnitude and cost of the social challenges which modern communities face, their members often do not display initiative: these powers appear to be latent, and have yet to be harnessed and applied efficiently. One effective way to change attitudes is to educate multipliers to assess a crisis and immediately initiate solutions within their communities. Instead of passively observing a crisis develop and leaving it to be resolved by the centralized authorities, multipliers need to read and act (“ReadAct”), to do research about the problems and then motivate themselves and others into action.

Reading and writing form the foundation that is the base of any educational process for the empowerment of both individuals and entire communities. An educational approach that couples reading to acting (e.g. teaching reading at school is made relevant to the daily experiences students have in the community), could prove effective and efficient in helping communities address their own social challenges. At the same time, an approach which motivates youngsters to read about local challenges could also help address a more general dilemma: young people’s growing incapability or unwillingness to read literature.

Data from the 2015 Program for International Students Assessment (PISA) indicated that 20% of youngsters averaging 15 years in age fail to reach minimal reading capacity in OECD countries (Organization for Economic Co-operation and Development). The situation in Brazil – where part of the research reported in this paper was carried out is no exception (FAILLA, 2016). Even in Germany (Kote, Lietz and Lopez, 2005) where the results of the present research are planned to be implemented in the future, the percentage of 15-year-olds without minimal reading capacity is reported to be as high as 16%. These students do not reach level 2 (“baseline level of reading” which enables a person to lead a normal life and participate in society) - a statistic which must alarm teachers and authorities in atleast one of the richer countries of the OECD. These findings can be partly explained with a high influx of refugees in Germany because the majority of them have not even studied in the regular school system yet. However, once they begin, many of them will still fall short of the baseline level of reading simply because they have not had much contact with the German culture and language yet, even if in their countries of origin they may have belonged to the 80% of the population with enough reading skills to lead successful lives. It is thus important to empower students and teachers to develop and improve their reading abilities by motivating them to act on solutions to problems in their own social context.

This paper presents a gamified empowerment approach to train future teachers. This approach aims to innovate teaching strategies and provide a system to motivate young readers to apply acquired knowledge towards acting on social challenges within their community. The approach is supported by an alternate reality serious game (called “ReadAct”) which blends reading instruction with opportunities to act on social responsibility in the real world. Players use reading to investigate problems and to do research in order to find resolutions to real challenges to the community. It is expected that ReadAct will motivate players to read because they are interested in real-life challenges to their own community and are additionally motivated by new information technologies such as serious games.

The ReadAct approach was successfully tried out in a serious game concerning water conservation, called AquaGuardians (Barros et al. 2017). In the present paper, however, the approach is described in more detail and elevated to a meta-level in order to promote a more general, common design in the
development of related serious games. The paper reviews the ReadAct approach in three different, but related contexts, to allow for a wider range of preliminary validation scenarios:

1) Teacher training for drama reading
2) Environmental education
3) Introduction to computing

The research involved more than 160 stakeholders. Results indicate that the ReadAct approach may contribute to the improved design of serious games as support tools for reading education motivated by social responsibility and serious games.

Section 2 discusses related work. Section 3 describes the ReadAct approach in detail and how it was implemented in practice. Section 4 presents results from validity experiments for the proposed approach, and Section 5 offers analyses and considerations on design aspects and on potential applications of the ReadAct approach to social challenges in the areas of intercultural integration of refugees in our societies.

2 RELATED WORK

This work relates to theatrical reading of multimedia texts to “transform readers into actors.” “Dramatic Wednesdays” is a Literature and Scenic Arts project at the University of Brasília, Brazil where participants proceed from individual and silent reading to collective reading using oral and body languages. Readers and spectators may take part in the play “to reflect on the scenic reading towards transforming society” (Gomes, 2012). Similarly, the “Reading in Scene” from the Federal University of Alagoas, Brazil reading is taken up as a performance activity through which the reader, in contact with the intended sensorial interactions embedded in the written word, experiences possibilities of education, transformation and reconfiguration of perceptions about him/herself and about the world (Oliveira, 2010). These projects however, do not address specific social challenges, and they are intentionally derived actions coordinated with the support of a serious game as the ReadAct approach does. Serious games use intrinsic incentives – such as conquests, social responsibility and ability building – and extrinsic incentives – such as points, proactive feedback and (game proficiency) levels – to maintain players’ interest in learning a given content and to motivate them to attain a desired proficiency level in the activities that may be proposed in the game story (Kankaanranta; Neittaanmki, 2008).

Alternate reality games can aim to make the player cross borders of the magic circle of the game experience and bring the player to act in some useful way in the real world (Huizinga, 2014). Such games, as proposed by Jane McGonigal (2011), explore everyday experiences and cultural settings. However, these approaches often do not incorporate new teaching-learning management paradigms and tools to engage players in addressing community challenges despite breaking new ground in game research. Other games, such as AquaGuardians (Barros et al., 2017), do address complex, important social problems and also use “reading or writing missions” to educate players on a given social problem (sustainable water management, in this case). Here, the ReadAct approach is used to define reading missions in serious, alternate reality games which may be applied to motivate engagement of communities to address challenges in a wider spectrum of social contexts.

3 THE READ & ACT APPROACH

ReadAct is an innovative approach to teaching and learning that uses alternate reality and serious games in schools, including the reading and production of theatrical texts in order to develop reading and writing abilities, improve performance in interdisciplinary subjects, and increase engagement of teachers and students in social actions within their students’ communities.

ReadAct games revolve around missions which are run partly in the virtual world and are made up in the context of the reference story (i.e.: gameplay in computers and on mobile devices); and partly in three real world settings where students can practice applying knowledge acquired from curriculum and theatrical texts to address real world social challenges within their communities. There are 3 performing stages:

1) At school (educational space)
2) On the Web (online game space), and
3) In the community (real world space).

As the game proceeds, players’ (students’) awareness of the social challenge of interest spirals up like in a vortex whose height and width represent the accumulation of knowledge and the potential benefit for the community (Figure 1).
Figure 1: ReadAct spiral for growing knowledge (z axis), organization (stage size) and initiative for action (x, y).

By performing on the three stages - which also represents the players’ world (school, virtual world in the web, and community), knowledge about the social challenge of interest is built by the readers-players through educational ReadAct missions under the leadership of a mentor who is meant to inspire others. This knowledge will be successively converted and articulated to become part of the knowledge base of each player. The spiral starts again after being completed once (in different missions in the game) at higher levels of players’ capacity, amplifying the application of acquired knowledge about the social challenge of interest to society’s other “problematic” areas. In these progressive cycles of the spiral, with knowledge conversion and multiplication, players (students who are changing into social actors) teach new players and function as multipliers and mentors.

On stage, players, presented with a sequence of situations previously programmed by the teacher, play the role of persons who had problematic experiences related to the social challenge of interest. Orally or in writing they must describe their experiences to other groups of actors of the same situation, to gain intercultural awareness and collaboratively find a solution to a social issue by applying information from the curriculum and from the theatrical text used to seed missions of the game.

Missions cover specific, interdependent activities of leadership, research, teaching and extension for the creation of multimedia textual work pieces on a social theme whose value is acknowledged by the game community. These work themes come out of a knowledge management experience of a small group and are based on the reading of a multimedia document (text, audio, video, etc...) that relates to a social challenge of players’ interest. The player or the group of players may add to the document, becoming its co-author. Missions require theatrical readings when the player or group must contextualize the contents and recreate the document (writing assignments).

A set of missions defined by a specially appointed tutor or by government (social) agents, corresponds to one ReadAct session. A ReadAct session may be divided into sub sessions to contemplate the priorities in the school curriculum and operating agendas and thus synchronizing with cultural agendas of players’ communities and with interested government agencies’ agendas.

3.1 Meta Game and Major Components

ReadAct is conceived as a design framework for serious games or as a meta-game which in the hands of the teacher transforms itself into a specific, alternate reality serious game addressing community challenges. In practice, the approach consists of three major, interacting components: a gamified Mobile App, a Web Georeferenced Information System (GIS), and a Marketplace.

A ReadAct game is played on two complementary technological platforms. On the Mobile Platform, the players have 5 resources do play with:

1) Alternate Reality Game Missions (ARG Missions) where they may geo-reference their real-world activities using the GPS facility and registering and uploading multimedia files,
2) Read-Write tools where they may report on their reading and writing missions in the real world,
3) Theme oriented mini-games,
4) Quizzes, and
5) Online marketplace to commercialize works they coauthored in the missions.

On the Web Platform, teachers, specially appointed student-tutors and government agents who play the game as instructors or tutors may:
1) Assign missions to students in the virtual and real worlds;
2) Access a control panel for monitoring (with graphs, statistics or reports on the gaming experience);
3) Access a geo-referenced information system to manage students’ activities and teaching/learning indicators;

4) Use pedagogical tools to train players;

5) Be a part of a closed ReadAct social network or connect to major open networks such as Facebook and Instagram or,

6) Take part in transactions in the marketplace.

The integrated marketplace may help sustainability by merchandising ReadAct game artifacts; it also offers players a venue for commercializing co-authored works with points or virtual money awarded for accomplished missions. Virtual money may be exchanged for real goods (e.g.: a ReadAct T-shirt) or services (a movie ticket) in the real world with the help of participating ReadAct business partners. As partners contribute to the expansion and sustainability of a ReadAct game by providing goods and services in the marketplace, they also improve their social responsibility image as perceived by the game community.

For the initial versions of the ReadAct games considered here, the mobile component was implemented for the Android platform, with Google maps native GPS and MySQL database. The Web component was implemented as a Restful Web Service using JAXRS and/or Unity. For simplicity of these initial versions, the marketplace was implemented offline and it was not integrated to the other components.

3.2 A ReadAct Game Example

Figure 2 shows some mobile app screens of the ChangeTrees game which follows the ReadAct-functioning principles to engage tutors and students of computer science in activities to prevent urban violence.

By completing each of the three steps needed to advance to the next level of the spiral, players elevate themselves by readings on topics such as mathematics and literature (height of the spiral - z axis) and the level of impact that their organization and initiative have on the urban violence social problem (vortex diameter – axes x and y).

The game starts with the teacher or master tutor facilitating the group processes of

1) Selection of an existing social challenge (e.g. urban violence),
2) Creation of groups of readers,
3) Definition of success indicators and
4) Definition of the pedagogical project.

Figure 2: ReadAct approach-based ChangeTrees game mobile app screens (available from Playstore).

Theatrical readings follow under the lead of the appointed group tutor (one of the group’s students). The group tutor also supervises research on the chosen topic, training which the group may need and interactions with the target audience of the social actions associated with the game missions (the local community outside the school).

Examples of dynamics and characteristics such as missions for other ReadAct games, may be found in (Barros et al., 2017). For instance in a ReadAct game for water preservation and management, a mission may include challenges to go out and register examples of water wastage or saving or a combination of all that (a notification of a problem in need of attention).

In any ReadAct game, missions involve creativity in multimedia reading-writing, using an existing multimedia product (theme mini-games, a quiz challenge, a leader board game or other digital game), or the teacher may also embed teaching-learning indicators and assign weights to work to be produced by the students according to objectives of the pedagogical process, and manage these indicators by means of graphs, statistics and reports that support continuing evaluation and planning of this process.

4 PRELIMINARY VALIDATION

The ReadAct approach and associated gamification were subject to preliminary validation studies in a setting of teacher education in 3 contexts at the Federal University of Campina Grande (UFCG): Edgies – teacher training in the graduate program of literature and pedagogy; AquaGuardians – environmental education in the computer science undergraduate program; and, ChangeTrees –
introduction to computing and literature in the Computer Science tutoring program and introduction to programming in the electrical engineering undergraduate program.

In the Edgies game, players chose to work on the problem of violence at school (bullying). In AquaGuardians players chose to work on the problem of water waste. In ChangeTrees players chose to work on the problem of urban violence.

In this context “teacher” is any person trained in the ReadAct approach to be a “volunteer tutor”. In this sense, a teacher may be any professional trainer, including those in the area of education or already certified teachers themselves. This situation is representative of many real scenarios where professionals from different areas volunteer to help with a solution to a social problem whose complexity may increase due to cultural barriers or speech or writing limitations in a given language.

The validation studies discussed here are preliminary and based on the principles of experiment observer reliability (LITWIN, 1995). The studies were carried out to verify whether ReadAct would positively impact for the two following success indicators:

A) Level of reading motivation and

B) Engagement in social activities related to violence at school (bullying), to water waste and to urban violence.

Various validation experiments were performed with a total of 145 “teachers” (19 to 35 years old, 23.5% male and 76.5% female) from primary and secondary schools for a duration of 4 months in 2017. Nineteen were “teachers” of Portuguese (13 played at UFCG and 6 played at primary and secondary schools in the city of Sumé, state of Paraíba, Brazil); 32 “taught” environmental education at UFCG; and, 94 were teachers of introduction to computing (31 played at the tutored education program in the computer science course at UFCG and 63 in the electrical engineering course at the same university); and 2 functioned as “teacher training agents” in preparing 4 missions in the real world besides text, audio, video and HQ assignments and orchestrating social actions in the players communities.

All the players played the same ReadAct game composed by 4 read-writing-acting missions embedded in the 3 games (Edgies, AquaGuardians and ChangeTrees). All participants in the experiment were trained in the 5 ReadAct resources and facilities available in the 3 used games (Edgies, AquaGuardians and ChangeTrees) to play the mobile or the Web app of each game as student or teacher. Only the multimedia seed texts were different. Each game was played for 4 weeks with players free to play the theatrical mini-games but obliged to run the 4 real-world missions together with their students at the schools where they work. Figure 3 shows scenes of ReadAct being played at schools.

![Figure 3: Playing ReadAct games.](image)

After the intervention period at the schools revolving around the missions, the participants were asked to opine on the influence of each of the 5 resources and facilities of ReadAct game embedded in the 3 games on two indicators. The considered indicators were:

A) Influence of the 5 ReadAct games’ resources on increased motivation to (continued) reading and

B) Influence of the 5 ReadAct games’ resources on increased motivation to initiate social activities in the real world by using knowledge embedded in theatrical texts they had read.

Graphs 1, 2 and 3 present results. On the average, 97.65% (=[(42,07+55,86) + (49,65+46,21) + (6,21+91,72) + (34,48+62,76) + (11,72+87,59)]/5) of the overall opinions in Graph 1 are that the 5 resources and facilities of the ReadAct game (much or somewhat) influence the increase of players’ motivation to (continued) reading. From Graph 2, the overall average of 96.56% (=[(26,89+70,35) + (25,52+69,65) + (11,03+86,21) + (15,86+82,07) + (21,38+73,79)]/5) of the opinions point towards the conclusion that the 5 resources and facilities of the ReadAct game are of much influence on players’ decisions to engage in real-world social activities (utility).

Graph 3 illustrates the perceived contribution of the five ReadAct resources and facilities to the results in Graphs 1 and 2. The ARG Missions facility was considered by 40% of players as having the most influence on the first indicator above, and by 59.3% of players as having the most influence on the second one.
CONCLUSIONS

This paper presented the ReadAct approach to build alternate-reality serious games which blend tutorial-based education and theatrical reading (and writing) of multimedia contents about a given social problem. The approach seeks to empower teachers and students of a school to take individual or collective action to solve the given problem in the context of their community. Essentially then, a ReadAct game aims at turning the school community into a community school with an integrated view of academics and social services. Besides gamification techniques of conventional games that are used in its mobile app, the proposed ReadAct game also offers a Web geo-referenced information system for teachers and specially appointed tutors to create, dispatch and manage geo-referenced missions for the players (individuals or groups of students) in the real world in addition to reading assignments that explore principles of crowd sourcing, utopia, incentives engineering, knowledge management, trust verification, and entrepreneurship and e-commerce (as implemented in the marketplace component).

Validation studies were carried out with 3 ReadAct games (Edgies, AquaGuardians and ChangeTrees) over a period of 4 months, involving 145 participants. Results were collected through a post-use survey and suggest that the ReadAct games’ facilities and resources motivate players to transcend their original roles as students, teachers and appointed tutors towards the role of voluntary social actors, and they also positively influence success indicators defined for reading and social activities. It should be noted however, that the presented results serve only to support face validity – i.e., that the approach seems to spur desired social actions; further work is required to really ascertain that the approach will be useful in spurring social activism of the type required by the specifics of crises or problems at hand.

Ongoing work includes experiments with longer term usage of ReadAct games, larger player communities, and some selected social challenges in the areas of violence against women, child obesity, homophobia, dengue fever, and unemployment, to produce statistically more significant results and to
evaluate influence on other indicators related to respective social problems. The University of Applied Sciences Koblenz, RheinAhrCampus has expressed the wish to try out the ReadAct approach for their courses in Social Entrepreneurship and wants to co-author a specially designed serious game for the intercultural integration and inclusion of refugees in rural communities.

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