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EDITORIAL

Game-based learning for positive youth development: A preventive approach

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Introduction

Adolescents grow up in a digital environment which promotes and at the same time threatens the development of their bio-psycho-social well-being (1). Teens in the United States in 2015 on average spent one hour and twenty minutes playing video, computer, or mobile games (2). Another study found that they spent about 6 hours a day in 2016 on digital media and on social media (3). New media, including computer games and social media, is an important part of adolescents' daily experiences. From a positive view, we need to develop more digital game-based learning (DGBL) materials to promote the wellbeing of young people through self-help and peer influence. However, a majority of adolescents' favorite commercial games usually involve violence and pornographic content. Moreover, there are concerns that computer game use puts adolescents at risk of addiction, violence, sexual exploitation, exposure to hateful or discriminatory contents, online and offline victimization, social isolation, and so on.

Game-based learning for positive youth development: A preventive approach

Games have a long history as they can promote bio-psycho-social well-being for all ages. Parents, teachers, social workers, and mental health practitioners may use different types of games, including chess, board, card, physical, mental and spiritual activities, and video/digital games for educational purposes. The design and use of digital games in education developed together with the rise of home computers. Prensky (4) first coined the term digital game-based learning (DGBL). Since then developers have produced educational games

according to educational theories to enhance engagement and learning outcomes. However, the number of educational digital games can hardly compare to that for entertainment purposes. While the controversy of possible ill-effects of many digital games is still on-going, the rapid development of new technologies facilitates the design and production of digital games that hold potential for education, medical and health, humanities and social sciences, and many more disciplines. Charities and non-profit making organizations that support bio-psycho-social-cultural well-being are becoming aware of the effectiveness, efficiency, and potential contributions of digital games to their causes and social impact. They contributed to supplementing the gap left behind by commercial companies. As part of the effort in promoting positive youth development (PYD) among early adolescents, seven digital games were designed and developed to support the Project P.A.T.H.S. which has been recognized as an evidence-based intervention by World Health Organization for ending violence against children (5) and promoting life and social skills in adolescents (6). These games will strengthen the intervention strategies in prevention at primary, secondary, and tertiary levels. This special issue will focus on theory, practice, and initial evaluation of these digital games designed for the enhancement of PYD (hereafter referred to as DPYD games).

Prevention

As an interdisciplinary field to address the need for prevention-related research, numerous studies in prevention science have demonstrated with increasing evidence that many antecedents of risk behaviors can be prevented. They also support that primary and secondary prevention is much better than tertiary prevention because they save lives, minimize harms of different kinds, reduce public expenditure on expensive remedial treatment of risk behaviors, promote positive development, and build a better environment for children and adolescents. The latest development in prevention science witnesses the development and evaluation of DGBL.

Digital game-based learning (DGBL)

This trend suggests that DGBL will become one of the major teaching and learning strategies in prevention, particularly in education (7-9), health fields (10-12), social-emotional learning (13-14), and treatment, for example, of children with attention-deficit/hyperactivity disorder (15). The presence of digital games in promoting social-emotional learning (SEL) and positive youth development (PYD) is spreading due to their favorable results in terms of intended learning outcomes and users' engagement (16).

Many studies have examined the negative impact of playing video games, such as addiction, aggression, interruption of sleep habits, and parent-child conflict. Only a few studies have investigated potential positive outcomes (17-18). However, very few studies demonstrate a link between playing video games and enhanced well-being, problem-solving skills, intergroup relations, and physical activity (10, 19-21). This special issue is an effort to explore further the impact of DGBL on PYD.

Adolescent issues and digital positive youth development game: A conceptual framework

We are now living in a digital age. Many children and adolescents and their parents keep using their smartphones and computers day and night. It is very difficult, if not impossible, to trace the effects of smartphones and social media on adolescents although it seems that the effects are potentially profound (1). Rapid changes in the contexts of varied exposure to media contents, playing on-line games, connection with different on-line groups, post challenges and create opportunities for adolescents. From developmental and preventive perspectives, we are concerned about how adolescents handle their developmental tasks in the digital era with regard to the fact that their bio-psycho-social-cultural-behavioral interactions with family and peers have been changed drastically as compared to that of their parents. We may even agree that with the rapid development of information and communication technology (ICT), substantial contextual changes in

the environment of adolescents could take place in months, based on Moore's law (22) that the speed of the central processing unit of a computer will double while the price will go down about every two years.

The uses and gratification approach in explaining how adolescents use and are affected by the use of smartphones and new media is far from adequate because its assumption on individual characteristics and decisions are convincingly confronted by Kahneman's Nobel Prize winning study on irrational judgment and decision-making in times of uncertainty (23). Bronfenbrenner's (24) perspective on interactions between different social spheres is well-accepted to guide studies on media effects on adolescents. Based on Bandura's social learning theory and Gerbner's cultivation theory, Steele and Brown's (25) media practice model which covers personal identity, characteristics, daily practices, and the environment is a more specific approach to examine the factors for the media to induce various effects on adolescents.

Why these games?

When focusing on early adolescents (aged 12-15), we witness changes in the following ways:

1. disrespecting others, engaging in dishonest, criminal on-line behaviors, and cyberbullying partly due to a wrong conception of anonymity in the cyber world;
2. being confused in building one's own identity partly because of premature decisions based on irrational judgment and decision-making (23) as well as information explosion;
3. experiencing difficulties in bonding with parents partly due to the use of "electronic pacifier," the lack of parental attention and quality parent-child time as a result of over-use of smartphone and social media (26), and in relating to peers as a result of weakened

communication skills and emotional development (27);
4. having gender stereotypes and biases partly due to the biased advertisements and media contents; and
5. emphasizing money and success in cultivating their value systems partly because of media exposure.

As a prevention measure, seven digital positive youth development (DPYD) games were designed and developed. By strengthening relevant PYD constructs, these games target at enhancing the players' competencies.

Seven digital games for PYD: A brief description

With the support by the sponsor, the seven DPYD games introduced in this special issue were designed mainly for the promotion of five core competencies among the 15 PYD constructs identified in successful programs by Catalano et al. (28), namely, social (SC), cognitive (CC), emotional (EC), moral (MC), and behavioral competencies (BC) as well as the following seven constructs, namely, clear and positive identity (ID), self-determination (SD), self-efficacy (SE), bonding (BO), resilience (RE), spirituality (SP), and prosocial norms (PN) among adolescent users of these games. Only three constructs were not included—promotion of beliefs in the future (BF), providing opportunities for prosocial involvement (PI), and recognition for positive behavior (RP). Although DPYD game design must provide immediate positive feedback and reinforcement of RP and PI at the cognitive and intention levels, responses in playing DPYD games are not actual behaviors. Table 1 shows the name, adolescent issues addressed, and targeted PYD constructs of each game.

Table 1. Adolescent issue addressed and targeted PYD constructs of each game

	Name of the Game	Adolescent Issue Addressed	Core PYD Constructs	Related PYD Constructs
1	The Digital Age	Respect for privacy	Moral Competence, Social Competence	Resilience
2	The Integrity Crisis	Integrity	Moral Competence, Social Competence	Resilience
3	The Bullying Storm	Bullying and cyber-bullying	Moral Competence, Social Competence	Resilience
4	The Male-Female Dichotomy	Gender stereo-types and biases	Clear and Positive Identity	Self-determination, Prosocial Norms, Social Competence, Moral Competence
5	The Great Thinking Adventure	Cognitive traps	Cognitive Competence	
6	A Journey to Somewhere, to Someone	Friendship and love affair	Bonding, Social Competence, Behavioral Competence, Emotional Competence	Self-Determination, Clear and Positive Identity, Prosocial Norm
7	Live a Meaningful Life	Money and success	Spirituality	Self-efficacy

Overall aims of this special issue

This special issue covers a collection of seven digital games as a demonstration of the state-of-the-art non-commercial "serious games" (9, 29) for promotion of PYD among adolescents. The design of each game and how it can be creatively used by teachers and professionals to achieve the purposes of primary, secondary, and to a smaller extent, tertiary prevention are presented. An early female adolescent studying in an international school in Shanghai and a 19-year-old male college student in the United States were invited to play all the games and provide detailed comments on their learning experiences. Their insightful comments and feedbacks are presented. Difficulties in the use of DGBL technologies will also be discussed, although technical issues in game development are omitted. Some papers also address implications for ongoing research that will further our knowledge of how DPYD games affect youth development. The use of distinctive game design principles and elements (e.g. rules of play, point scoring, competition with others, immediate feedback) in promoting PYD are discussed in the first paper.

This special issue has demonstrated the design and development of DPYD games which show the practice of permeation of gamification (10) and the application of game design principles into positive youth development through e-learning and as a supplement to the conventional learning procedure as a future emergence.

Theory and practice of using DPYD games for prevention

In this special issue, the first paper offers a thorough discussion on theory and practice of design, development, and use of digital games for the enhancement of PYD constructs. Education theories, concepts and knowledge of gamification, GBL, game principles, and DGBL are reviewed to provide theoretical underpinnings to support the development of these seven games. It also discusses the importance of enabling young people with relevant knowledge and skills to handle commonly found issues properly.

Furthermore, this introductory paper discusses how and why the creative use of these games will serve the purposes of prevention. For primary prevention, it is to protect adolescents from engagement in risk behavior and harm. These DPYD games are designed for early adolescents (S1 to S3, Grades 7-9) in English, traditional Chinese and simplified Chinese. For secondary prevention, the DPYD games provide guidance and feedbacks according to users' responses to some relevant and valid psychosocial measures. Adolescents who experience some problems in one or more of these common issues could benefit from the feedback generated according to their choices in a number of carefully selected psychosocial tests. It is particularly useful when students are encouraged to use the print-screen function to keep the feedback and replay the game using different strategies or available options.

Learning can be consolidated when students compare and contrast different outcomes or results with their choices during different stages and at the end of the game. For tertiary prevention, adolescents who suffered from problems in these common issues could be helped by using selected parts of the game as initial engagement, assessment, and part of the intervention efforts to be jointly discussed and determined by the target user and the professional. Although the games do not keep any personal or psych-social test data on the computer in order to protect users, users can use the print-screen function to capture the results and feedback generated. With the consent from users, the print-outs can be used for engagement, raising target users' awareness of the issues and their responses to difficult situations, conducting initial diagnosis, and serving as topics for discussion on the use of knowledge and skills provided in the game to handle similar situations or crises.

Finally, this paper contributes to the development of a practice model named "STREAM" to promote PYD through digital games for prevention.

The design of three games on the same theme

The second paper discusses how game design knowledge is applied in the first three games and how they can help adolescents who face difficulties with on-and-off-line interpersonal relationship difficulties, including intruding into someone's privacy, following peers' dishonest behavior, and engaging in bullying and cyber-bullying with peers. The three short DPYD games, each runs for about 15-20 minutes, serve as a series of games on the same theme using three different stories.

Seven papers on seven games

The following seven papers each offers a review of a specific and current adolescent issue. Each paper demonstrates how teachers and professionals can use the specially designed game to promote core competence and related PYD constructs. Concrete suggestions on how to use the game creatively and effectively are presented. Each paper is supported by theory and users' critical comments as initial qualitative evidence. Theoretical and practical issues are discussed, and limitations and future research suggestions are presented.

The use of literature in a DPYD game

The last paper contributes to cross-disciplinary methodology in illustrating the use of literature in the design and development of a DPYD game. It provides a significant reflection on the nature and function of literature and its importance in promoting PYD constructs among adolescents.

Specific objectives

The papers in this issue tackle questions related to GBL and PYD. The newly developed games target knowledge acquisition and the development of qualities that are PYD friendly. In this issue, we explore how these games can be used to help adolescents acquire knowledge and skills such as self-awareness, moral decision making, perspective-taking, empathetic understanding, acceptance and respect of gender difference, avoidance of cognitive fallacies, effective communication, personal reflection, relationship building and maintenance, handling intimate relationships, and in managing their own finances as part of their game playing experiences. Moreover, we try to explore how these games can be used to support greater insight into the process and effectiveness of PYD and how they can be effectively used for the prevention of problems encountered by adolescents. In this collection of papers, we seek to

- review the literature on a range of contemporary developmental challenges and relationship issues;
- review the literature on game-based learning for PYD with an intention of preventive intervention;
- describe how these games can serve as additional resources to support the existing teaching and learning materials of the project P.A.T.H.S. to enhance its effectiveness;

- provide users' qualitative reviews on each game to identify their strengths and weaknesses;
- discuss issues related to gamification of PYD, in particular, to consider how user agency, gamification, transportation theory, learning theories, perspective-taking, communication, the use of literature, the integration of in-person individual and group counseling, and other factors that may affect the intended outcomes of these games; and
- develop further questions, practice guidelines, and recommendations for establishing preventive programs around using digital games to enhance PYD.

To achieve these objectives, the seven papers on each game contain four parts. First, it presents a review of relevant literature on selected contemporary adolescent developmental issues. Second, it gives a description of the game design, contents, objectives, and its relation to the project P.A.T.H.S. by detailing concrete teaching points with relevant concept maps. Third, it offers a discussion on identifying critical success factors after a presentation of the users' feedback and the viewpoints of implementers. Finally, a discussion on intervention strategies via the digital game is included to offer insights and direction for future game development and research.

Methodology

A significant portion of the paper on each game is devoted to the implementation and initial evaluation. To demonstrate the effectiveness of the games, the qualitative approach was adopted according to five dimensions that were used in the literature review:

- *Participants*: Convenient samples were used. Two participants, a 15-year old female student from Shanghai and a 19-year old male college student from the United States were invited. For the female participant, parental consent was secured.
- *Intervention*: Participants played the games in their leisure at home.

- *Methods*: For all games, no time limit and number of testing moments were set.
- *Outcome measures*: Free expression in written format. No word limit was set.
- *Data-analysis*. Reflective writings of participants were used for illustration.

Concluding remarks

On the whole, this special issue furnishes a rich description and discussion on the theory and practice of DPYD games, in particular, design, implementation, and initial evaluation. Papers in the special issue show a concerted and creative effort in providing preventive measures on commonly found adolescent developmental issues. They also demonstrate that the newly developed and specially designed games are in general efficient and effective measures to promote PYD and prevent some common adolescent problems from deteriorating in contemporary urban societies. Initial users' qualitative feedback supports their effectiveness. Findings related to motivational variables such as self-efficacy, situational interest, goal orientation, and engagement variables are discussed. It is noteworthy that the game on interpersonal relationship has a special feature of promoting cross-cultural understanding of the values behind Chinese and Western (English-speaking only) cultures.

Future effort is needed to improve the measurement of DPYD game use as well as conduct longitudinal research on the effects of DPYD games to identify if and how cumulative effects could result from the use in the presence of a multitude of important variables, under what circumstances and in what developmental stages.

Acknowledgments

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