

Transforming Google Drawings into a game-based nudging tool for collaboration

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Abstract. Going online with many teaching and work activities created challenges many users were not prepared to. Online meetings and classes were simple to deliver. What was difficult was making participants emotionally connected. There are still gaps in understanding how to engage participants in these types of sessions. One promising option is to use game-based methods, introducing ways to foster active participation and focus. But games are not easy to create since they require creators to master game design knowledge. Using digital platforms can be even harder due to coding skills requirements. Most users that need to deliver engaging online meetings and classes do not have these skills. One option is to learn from the simplicity of analogue games and use free well-known platforms such as Google Drawings. Using game mechanisms like tile placement and grid coverage are some examples that can help transform drawing software into games that deliver nudging experiences. Our proposal presents two case studies where participants in a meeting and a lecture played a simple collaborative game for 15 minutes. It helped the participants to engage in a nudging activity. Participants learned each other's names, communicated, and established a successful collaborative approach while expressing enjoyment. This process can be easily replicated and added to online meetings and classes, increasing nudging effects.

Keywords: Drawing, Board games, Nudging, Online Play; Streaming

1 Nudging challenges

Nudging was defined as a structured process to change human behavior can be traced from behavioral economics and the seminar work of Thaler & Sunstein [1]. They defined a nudge as an aspect of the choice architecture that affects people's choices. But is done without forcing the decision-makers, despite delivering predictable outcomes. It is a persuasive method that demands a balance between autonomous decision-making and manipulation from the designer of the decision process. These persuasive methods are implemented by persuasive techniques and technologies that aim to affect users' behaviors (e.g., to buy, act or do something predetermined) [2]. Inevitably, nudging leads to ethical debates about if nudging is manipulation and if it is possible to maintain the autonomy of the user [3].

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From the perspective of political studies, mainly focusing on maintaining a democratic and freedom of choice, Wilkinson [4] analyzed the problems nudges can create. The manipulation can occur in nudging, despite the requirement of free decision-making. Wilkinson recommends that, in order to be effective and not manipulative, nudging much consider people's feelings. It must be transparent and express what is trying to accomplish. People should voluntarily stop the nudging effect and be constantly informed of the ongoing changing processes.

Recently, Sunstein [5] recognized the challenges nudging approaches faced. Sunstein highlighted ten typified nudges examples from where it is possible to define some guiding characteristics for nudging. These can be guidance traits to implement nudges in a practical way. They are: default rules and social norms; simplification of the rules and processes; information easy to use and understand; use graphics and tangibility; use precommitment and focus on goals; use reminders; highlight the impact of the decision and what changed. From these recommendations, we propose reducing and simplifying these traits to three dimensions of nudging: Simple to use; Focus on goals; Express effects. Simple to use benefits from default social rules and social norms must be easy to understand and get information. The focus on goals relates also to the easiness to get the information, highlighting the impact of decision-making and how it contributes to goal achievement. Both dimensions are voluntary.

The previous dimensions can complement the proposal from Ly et al. [6] to boost self-control and help individuals follow through with a decision in a mindful and voluntary environment. The same design options can encourage or discourage some behavior. The proposed game-based approach follows nudging requirements to deliver an activity to foster collaboration between players.

2 Games design as tools to foster nudging

Games are interactive rule-based systems that provide experiences for users [7]. They must be voluntary experiences nevertheless [8]. Games are often about decision-making, where players affect the game state and results [9]. Scripted games, where player decisions do not affect game results, are avoided and tend to be considered inappropriate game design [10]. Although game designers define the game systems and may manipulate the type of experiences players will experience [11], it is possible to provide game systems where the players recognize the decisions at stake and their effects.

Analog games have specific traits that favor nudging. These games, cards, boards, and many other types of analog games have transparent systems [12]. They do not have hidden algorithms and their associated "black boxes". What happens in the game is easily perceivable once players understand the rules [13]. These games demand higher player agency. Without direct engagement and activation of the game mechanisms, the games would not function [14, 15].

Despite digital games' domination, analog games are not a pastime from the past. Some authors say we were living in a golden age of board and tabletop gaming [16, 17]. This gaming popularity was an evident trend before the COVID-19 Pandemic. Regardless of the impact in the board game industry with the limitations of playing face-

to-face, people are eager to play these games as part of the post-digital movement [18]. The continuity novelty of games [19], despite the reduction of new game releases in 2020 and 2021 [20], is expected to recover and grow in the post-pandemic age[21].

3 Playing with Google Drawing to nudge collaboration

3.1 Methodology

Google Drawings was transformed into a game to generate a nudging experience to foster collaboration. The rule set was as simple as possible, played online just by accessing a link.

Game design options were simple, profiting from *Google Drawing* tools to draw different shapes and forms, defining their dimensions and colors. Tile placement and grid coverage mechanisms retrieved from modern board game design were the core game mechanics [22, 23]. Players should move their shape to create a continuous area (individual forms side by side without overlay). Players were incentivized to talk and suggest other players' moves. It embellished a collaborative process. Using analog game mechanisms is an easy way to build low-complexity games. Training analog game design is a way to train and teach videogame designers [24, 25]. In this case, the game mechanisms maintained the transparency of an analog game since there was no hidden information. Google Drawing allowed the feeling of moving pieces (the forms) over a table.

The games occurred during two sessions with different players. Each session was played with the support of streaming tools (*Zoom* and *Microsoft Teams*). The player was using *Google Drawings* but could communicate through the streaming tool. The session had the mediation of a facilitator that instructed the players, following a similar but simplified approach that Sousa [26] defined for a collaborative decision-making exercise using *Google Sheets*.

Both sessions we attended by undergraduate university students (ages 18 to 25). The first one during a class about urban planning and the second one with health students.

Game rules

In the proposed Google Drawing Game (GDG), the players were invited to pick an available form (i.e., figure, shape) as they like, add their name inside it, and change colors to fit their tastes. After this, the game facilitator instructed all participants to find ways to move and rotate their forms to fill as much space of the white background as possible. The players' forms (shapes) should not override each other. Each player's form represented the individuality of each player, and the override was the metaphor of giving a comfortable space to exist in the collective effort to fill the gaps.



Fig. 1. Sequence of play over Google Drawings to achieve collaboration through Nudging

Accessing Nudging

Mixing the ten recommendations from Sunstein[5], game dimensions (Rules and Outputs), and the table from Ly et al.[6], we propose the following accessing framework for mindful nudging experiences. The game must be simple to use and focus on goals, allowing players to consciously decide and interact with each other's and see the effects of decision making.

Table 1. Framework to define the effects of game rules and game outputs for nudging

	Internally Imposed		Externally Imposed	
	Encourage	Discourage	Encourage	Discourage
Activating a desirable behavior				
Boosting Self-Control	Game rules		Game outputs	

During the game, encouraged and discouraged behavior can be triggered by the same game mechanics and dynamics. The game rules and outputs all contributed to achieving desirable behaviors, imposed internally by the game system and externally by the players' experiences. But game rules are more internally imposed upon the players. The rules must be simple and meaningful to keep players' agency and provide the most freedom as possible for decision-making. The game outputs are what the game generates, what players perceive directly, to motivate the behavior change (players see the results of their decisions and change behavior if desired).

3.2 Overall results

Game results

The players played the games without expressing difficulty besides controlling the Google Drawings. The rules explanation did not lead to doubts, and the sequence of play had no downtime in any of the sessions.

Session 1 was attended by 11 players and had a duration of 9 minutes. This time included the explanation of the game, defining the players' forms, and working together to fill the maximum amount of space by joining players' forms (without overlay).

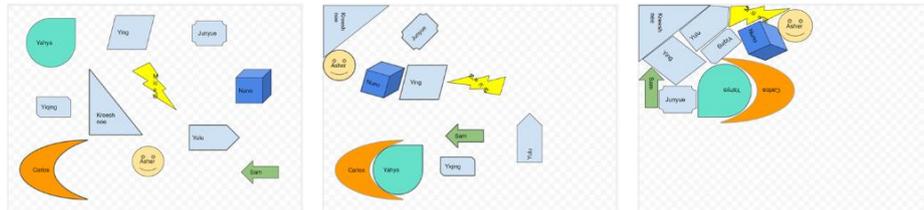


Fig. 2. Sequence of play during GDG session 1

Session 2 had more participants, which led to a longer duration. It took 16 minutes to do the entire process. 31 players participated in this second session. Considering the range from 11 to 31 participants allows doing this during a standard class or lecture.

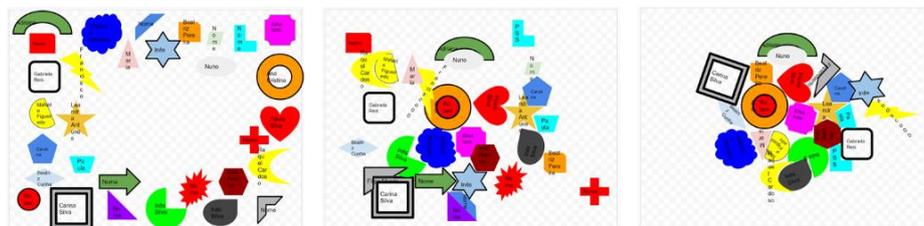


Fig. 3. Sequence of play during GDG session 2

All players actively did the sequence. They have done the individual part of setting their forms. It showed that some players spend more effort and care changing their graphic form. This configuration is a manifestation of individual expression. During the collaboration dynamic, some players moved did the moving more efficiently than others. In each session, a small percentage of the player, approximal 10% of the players, assumed leading roles. These informal leaders suggested to other payers what to do. Following the suggestions was not mandatory, but all players collaborated and adopted the solutions that provided better results. This collaboration contributed to the goals of the game. Some players had trouble moving and rotating the forms, mainly because they did not understand how to do it in the software. Debating helped players to plan where to put their graphical forms more efficiently. The result was not random but a collaborative output.

After each play session, the facilitator asked for commentaries for 5-10 minutes. In the two sessions, an average of 30% of the players participated in this discussion. They stated that it was an engaging exercise and that the metaphor of each form representing individuality and the need to adapt to generate the collective solution was evident. It highlighted the need to consider the different profiles and the flexibility to foster collaboration. Players need to change, place, and adapt to the other players' form (shapes representing different personalities). This was concluded without the need to instigate with a direct question. It emerged naturally.

Analyzing nudging dimensions

The players played the games without perceived difficulty. The rules explanation did not lead to doubts, and no significant downtime was registered in any of the sessions. The collaboration happened naturally. The definition of each player form and adding their name worked as a self-presentation. Moving the forms (representing game pieces) and suggesting other players' moves was easy in this online because a player could call for the name of any other player (written inside their form), give suggestions, and coordinate moves.

Table 2 shows how the GDG fostered some of the traits identified for a nudging process. Because a game is a system, one game dimension (part of the system) may trigger more than one nudging dimension stated previously. However, the framework, combined with the focus on the game rules and game outcomes, allowed defining the game dimension that impacted each nudging trait.

Table 2. The GDG game dimensions according to nudging general traits

	Internally Imposed		Externally Imposed	
	Encourage	Discourage	Encourage	Discourage
Active	Self-expression by choosing the form.	Choosing more than one form	Communication and collaboration.	Not collaborate and attend to the form of other players.
Desirable behavior	Do not overlap forms in a collaborative exercise.	to represent each player.		
Boosting	Analyze the state of the game. Adapt their form to fit the group.	Ignoring other players forms and moves.	Asking and giving help without forcing choices.	Ignoring the in-active and not engaged players.
Self-Control				

4 Discussion and gaps

The GDG was very simple and done without giving players much time to reflect. It delivered a chaotic experience that only could be solved by collaboration. This enforcing is a strength and a weakness of the proposal. Nudging should provide freedom of choice, and not collaborating was not an option to achieve success. What moves players should do, how to interact with each other, was up to them. They controlled the collaborative decision-making process.

The facilitator could not clearly evaluate if the players felt forced to collaborate. Online gaming hides the multi-level communication that players express in face-to-face games. Despite this lack of assessment, players could share what they experienced during the debate. None of the players expressed negative comments about the game. All the feedback was positive (30% of the participants on average shared feedback), referring that the game was surprising, fun, engaging and helped them to understand some of the key requirements for collaboration: communication, having a collective goal, trust, and collective decision-making that resulted from debate and testing. Regardless of these apparent positive impacts, this could result from bias and shyness. Ludic side

of the game may have hidden the enforcing. And payers that disagreed with these conclusions were uncomfortable in sharing their opinions. Players should have more time and tools to provide feedback.

Google Drawings proved to be a versatile tool, even allowing game-based approaches that departed from board/tabletop mechanisms like tile placement. But using another software having only the necessary options to play the game could reduce the complexity of the process. Players need to know how to navigate the software and choose the correct menu to draw their forms. The use of the streaming tools like Zoom and Microsoft Teams helped the facilitator to demonstrate how players could define their graphical forms and move them.

Because the game sessions were inspired by analog game designs, it is easy to replicate the same approaches even in face-to-face nudging sessions. Players can pick their graphical forms, illustrate them, cut them, and then collaborate to cover a surface without overlapping other participants. This possibility is a powerful metaphor to explore. The experience followed Sousa [26] method to address a collaborative decision-making process, but done more simply. GDG implementation reduced downtime frustration. It focused on the collaboration dynamic without breaking engagement.

5 Conclusion

The proposed game-based nudging exercise is easy to replicate. It can work as an “ice-breaking” exercise during an online meeting or a class. It can be done in 15 minutes as a dynamic to foster collaboration behaviors while allowing individual expression. But it can be the starting point of other more complex activities that emerge from developing the game-based approach.

Following the same methodology enables analyzing games from the nudging perspective. It considers games as rule-based systems where player agency impacts the game state and affects the game outcomes. The nudging approaches benefit from the voluntary nature of games that enhance player agency (more evident when playing board/tabletop games), even when played online. Game rules establish the framework and game outcomes the effects players can voluntarily consider.

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