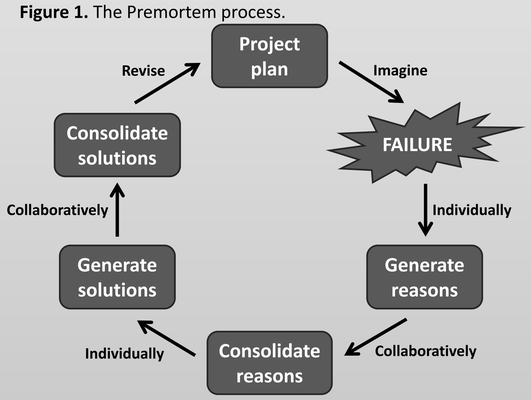
# Premortems in Game Development Teams: Impact and potential

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## INTRODUCTION

- Effective planning and agile re-planning are important for software development teams (Olson & Teasley, 1996).
- Effective plan evaluation methods are key, but the research is limited.
  - Planning Fallacy: Optimism drives poor estimates of time and success (Buehler et al., 1994).
  - Effective brainstorming or evaluation is challenging (Mullen et al., 1991; Putman & Paulus, 2009).
- Premortem is an implemented analytic strategy designed to mitigate these challenges.
  - Captures the diversity of ideas and concerns; useful tool for agile development processes.
- **Present study: Year-long project using Premortem with video game design teams.**

**Figure 1.** The Premortem process.




- **Premortem (Fig. 1):**
  - A "postmortem" analysis before plan is executed.
  - Group collaboration process assumes that 6-12 months out, the project has catastrophically failed – generate reasons for why it failed, and solutions.
  - Structured so each team member is heard, ensuring diversity of ideas.
  - **Mechanisms:**
    - **Prospective hindsight.** Accurate identification of reasons for future outcomes increases 30% when imagining that event has already occurred (Mitchell et al., 1989).
    - **Prospect theory.** People are more sensitive to losses than gains (Tversky & Kahneman, 1981).
    - Imagining project failure makes people more likely to accurately predict & plan for a wide variety of reasons for failure.

## METHODS

- **Participants:** 68 students in 10 teams from year-long video game development enterprise course (*M*=2yrs in course).
- **Task:** Evaluate pitched game ideas and plans using Premortem, then develop a game.
- **Measures:**
  - **Pre- (T1) and Post-Plan (T2) Questionnaires:**
    - **Confidence.** Rated on a scale from 0 *(not confident at all)* to 100 *(extremely confident)*.
    - **Anticipation of challenge.** Rated 9 elements on a scale of -5 *(not at all a challenge)* to 5 *(very much a challenge)*, "Don't know," or "N/A," depending on their game design.
      - Elements: Gameplay, Content, Level Design, Art, Sound, UI Design, Soft/Hardware, Teamwork, and Timeline.
  - **Premortem failure reasons & solutions.** Generated individually and shared as group during Premortem sessions.
  - **Follow-Up Reflections.** Open-ended responses regarding Premortem use given at the end of the year/project.
- **Procedure:** Depicted in Figure 2 below.




**Figure 2.** Study procedure over time.

## RESULTS

- **Confidence, after Reasons for Failure & Solutions discussed:**
  - Welch's 2-sample *t*-test indicated the team confidence ratings between T1 (*M*=71.80, *SD*=12.77) and T2 (*M*=83.44, *SD*=7.10) was significantly different, *t*(14)= -2.52, *p*=0.02. Average team confidence ratings are shown in Figure 3.
- **Anticipation of Challenge , after Reasons for Failure & Solutions discussed:**
  - Welch's 2-sample *t*-test indicated that team's challenge anticipation ratings for two game design elements significantly lowered from T1 to T2, shown in Figure 4 – Content, *t*(16)=2.27, *p*=0.04, and Art Aspects, *t*(16)=3.11, *p*=0.01.

**Figure 3.** Mean team confidence at T1 and T2.

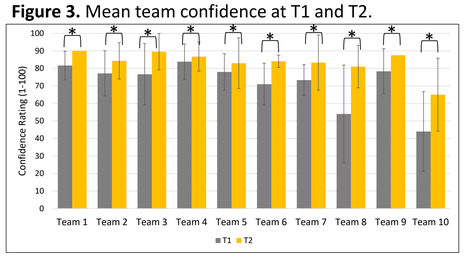



**Figure 4.** Mean team challenge anticipation at T1 and T2.

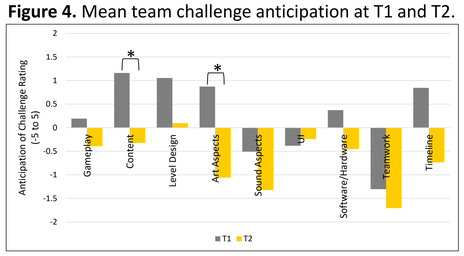



**Table 1.** Themes of the reasons for failure and solutions generated by participants during Premortem.

| Reasons for Failure | Example | Responses | Solutions | Example | Responses |
|---|---|---|---|---|---|
| **Execution, timeline** | "Tried adding too many extra features" | 63 | **Teamwork, communication** | "Speak up early if you're in too deep" | 78 |
| **Teamwork, communication** | "No one did their assignments" | 54 | **Technical solutions** | "Have an extra meeting for Git and Unity" | 52 |
| **Hardware, software, technical issues** | "Lack of Unity experience" | 39 | **Resource management** | "Revise old GUI setups from previous games" | 29 |
| **External issues** | "People have too many other priorities" | 12 | **Organization, planning** | "Break down large tasks into small ones" | 8 |
| **Poor user feedback** | "Controls aren't intuitive" | 8 | | | |

- **Premortem – Reasons for Failure, Solutions:**
  - Participants generated 176 reasons for failure (*M*=17.80, *SD*=2.04) and 167 solutions (*M*=16.70, *SD*=3.74) during the Premortem process, shown in Table 1.

## RESULTS

- **Month 8 Follow-Up Reflection:**
  - "While many members had overlapping concerns… everyone still had some unique concerns that couldn't be seen from one perspective." (Team 4)
  - "While the overall plan didn't change much, it was definitely brought under more careful consideration in the sense of being grounded in reality." (Team 7)
  - "If the problems still happen, it will be easy to solve them as we already discussed solutions to them." (Team 9)

## DISCUSSION

- **Confidence:** After completing the Premortem, team members' confidence increased, as they felt they had solutions ready to go in case of challenges.
  - Similar calibration in other planning contexts (e.g., Veinott et al., 2010).
- **Anticipation of Challenges:** Premortem significantly lowered team members' anticipation of challenges regarding their plans, as they had discussed these potential challenges (and solutions) in advance.
- **Reasons for Failure:** Execution of game complexity were the main reasons for failure generated during Premortem, followed by team communication.
  - **Solutions:** Only 2 teams' solutions involved scaling back design complexity; others focused on working smarter while maintaining their game design.
    - Fun game design may have led to motivated reasoning (Kunda, 1990).
    - Communication solutions rarely involved self-accountability and focused more on meetings.
- **Conclusion:** Premortem was easy and beneficial to the teams' plan development and executing their project. One of the first large scale evaluations of the method.

## ACKNLOWEDGMENTS

- The Husky Games Enterprise at MTU.

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