Software Engineering Processes in Game Development: a Survey about Brazilian Developers' Experiences

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Oral presentation:
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Introduction

Digital game industry is a **billionaire market**: U$99,6 billions in 2016 [31]

Game development has particular characteristics and problems which **raise its complexity** compared to traditional software development [4] [11]

Some authors recommend the use of a **Software Engineering** methodology to manage and develop game projects [6].

Several problems in game development [36][37]

Lack of maturity in game development [29]

“We’ve got so many specialists on the team, so the kind of planning that you usually do in Agile doesn’t work quite so well… You know [specialists] are **more concerned about the creative process than an engineering process**”. [29]

In the IGDA annual report, **52%** of the interviewers answered **“yes”** when asked if ***crunch time*** as a **necessary practice** during a game development. [46]

Objective

Surveying Brazilian game developers for relations between the engineering software processes used, problems faced and project’s success rate

Research Questions

1. Is there a relation between the process used and the project's success?
2. Is there a relation between the process used and the problems faced by developers?
3. Is there a relation between the developers' experience and the project's success?

Method

Setting specific, measurable objectives

1. Gather a list of **processes types** used by developers, regardless the period.
2. Gather the **success rate** of each process type in every project.
3. Gather a list of the most **common problems** faced by game developers in each process type.
4. Gather information about **game developers' experience** in years and if they have ever developed traditional software.

- Gather game developers' opinions about the importance and **adoption of Software Engineering** in game development.
- Gather game developers' opinions about the **differences** in building a **game** and a traditional **software**.
- Gather game developers' **adoption rate** of each **type of process**.

Planning and scheduling the survey

Brazilian game developers with **on-line questionnaire** during May 23 to June 6th

Designing the survey

We designed the survey in a way it could answer the objectives.

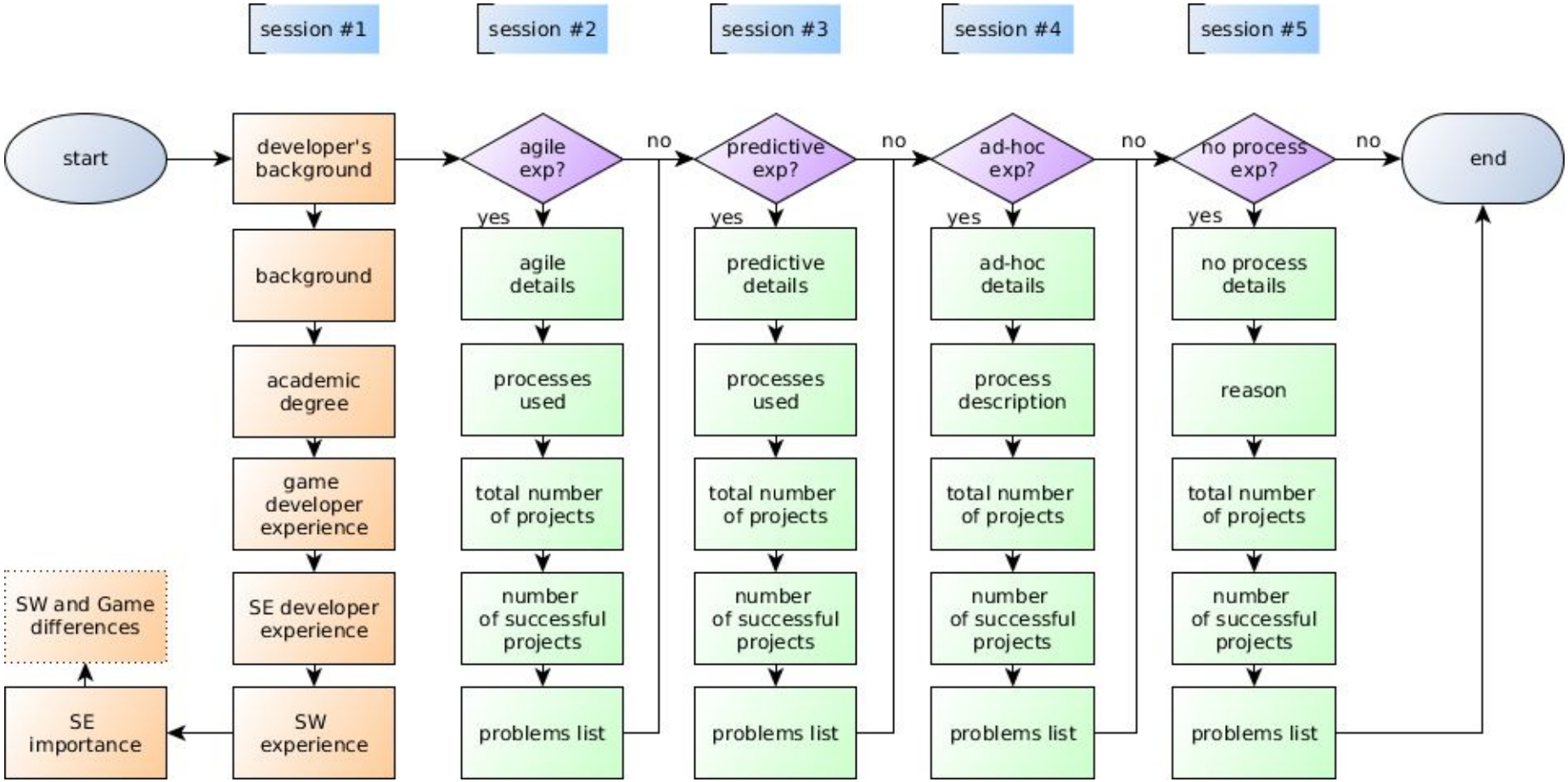
We divided the processes in four categories, regarding its nature:

Agile when software is built in an iterative approach with continuously process improvement.

Predictive when is derive from Waterfall, composed by a set of sequential phases and each one of them must be completely finished until the next step.

Ad-hoc when are not fitted with Agile or Predictive or were extremely customized for the company/team needs.

No-process (*code-&-fix approach*) when no process was used.


session #1
session #2
session #3
session #4
session #5
start
developer's background
agile exp?
predictive exp?
ad-hoc exp?
no process exp?
end
no
yes
background
academic degree
game developer experience
SE developer experience
SW experience
SE importance
SW and Game differences
agile details
processes used
total number of projects
number of successful projects
problems list
predictive details
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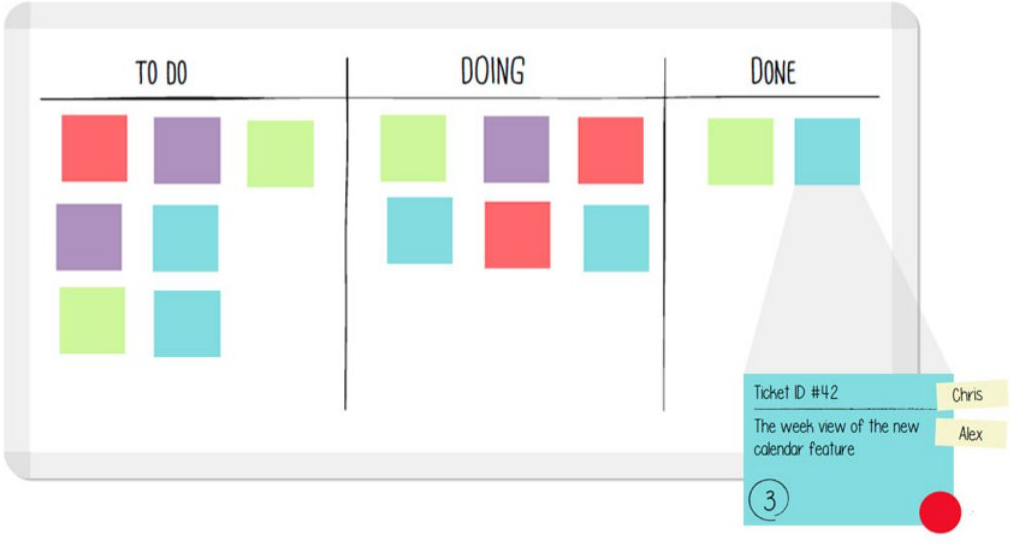


8. **Já utilizou, de forma integral ou parcial, algum método ágil para o desenvolvimento de jogos digitais?** *

Isso vale para qualquer projeto que tenha participado. Responda "Sim" caso tenha utilizado boa parte das atividades propostas pelo processo, ou seja, se a ideia central foi mantida.
Mark only one oval.

- ◯ Sim *Skip to question 16.*
- ◯ Não *Skip to question 9.*

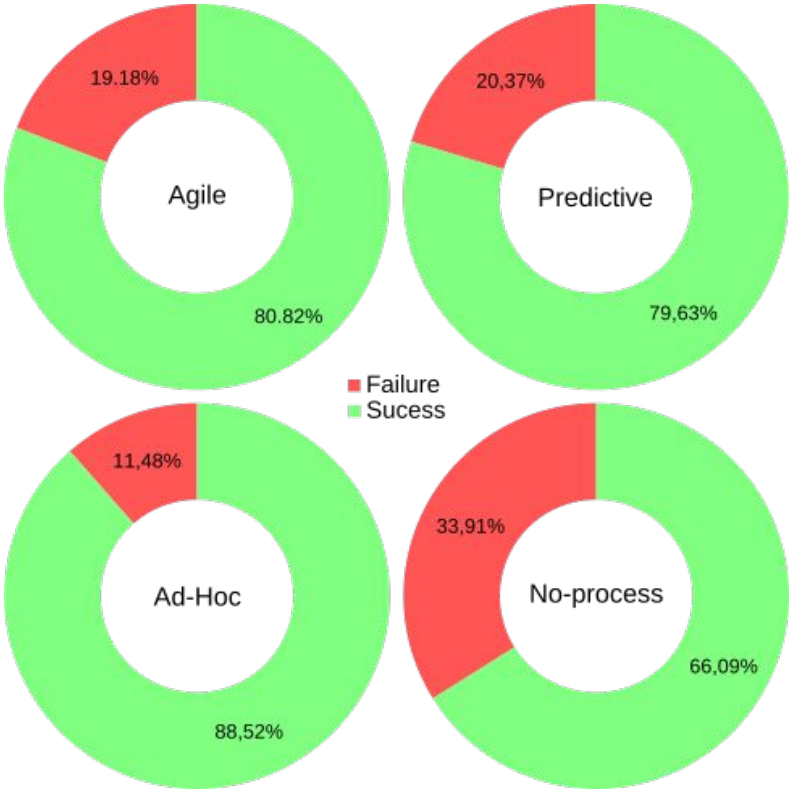
15. **Selecione os 3 principais problemas encontrados pela equipe, durante o desenvolvimento de jogos digitais, sem o uso de processos (code & fix).** *

Feature Creep se refere a entrada de funcionalidades tardiamente no desenvolvimento do jogo sem o devido planejamento. O termo Crunch Time é utilizado para os períodos de extrema sobrecarga de trabalho, tipicamente ocorrendo nas últimas semanas antes de marcos de validação e, principalmente, nas semanas que antecedem a data final de entrega do projeto. Nesses períodos, que costumam ser cíclicos, é comum uma jornada de trabalho de mais de 12 horas por dia, de seis a sete dias por semana, sem intervalos para descanso.
Check all that apply.

- [ ] Escopo do jogo não realista
- [ ] Feature Creep
- [ ] Corte de features do jogo
- [ ] Problemas no design
- [ ] Atrasos
- [ ] Problemas tecnológicos
- [ ] Crunch time
- [ ] Falta de documentação
- [ ] Problemas de comunicação
- [ ] Problemas com ferramentas
- [ ] Problemas com testes

Results

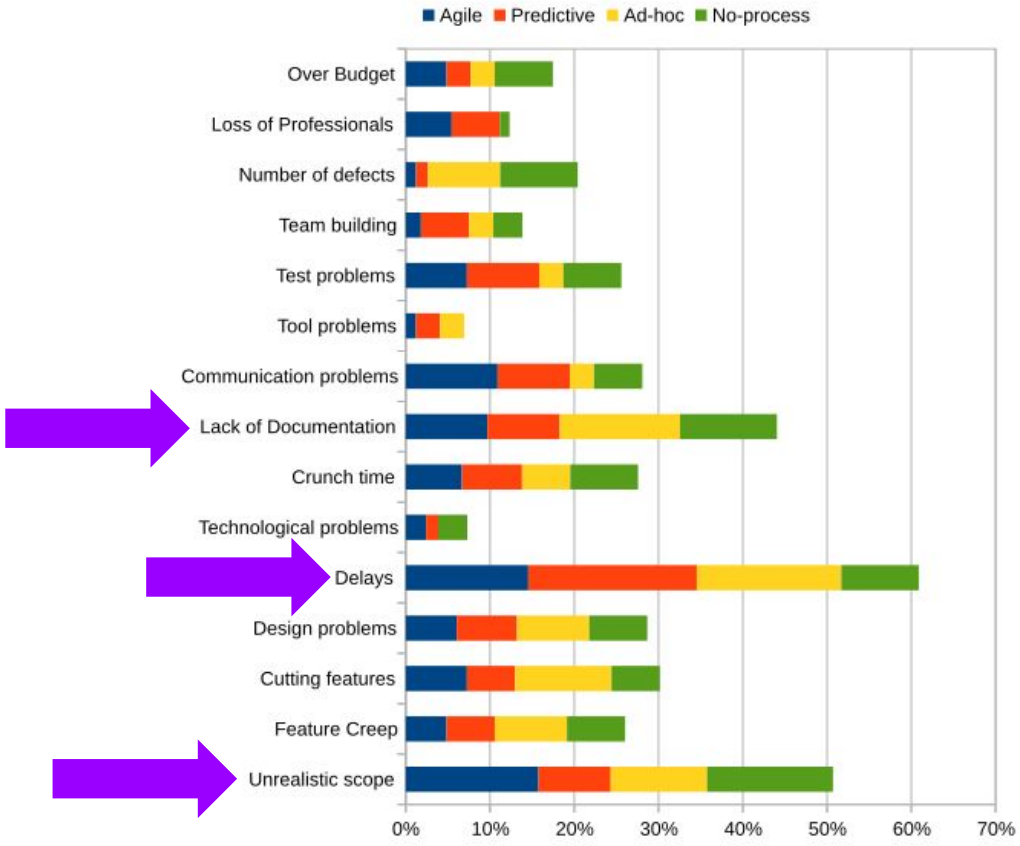
Success rate in every process type



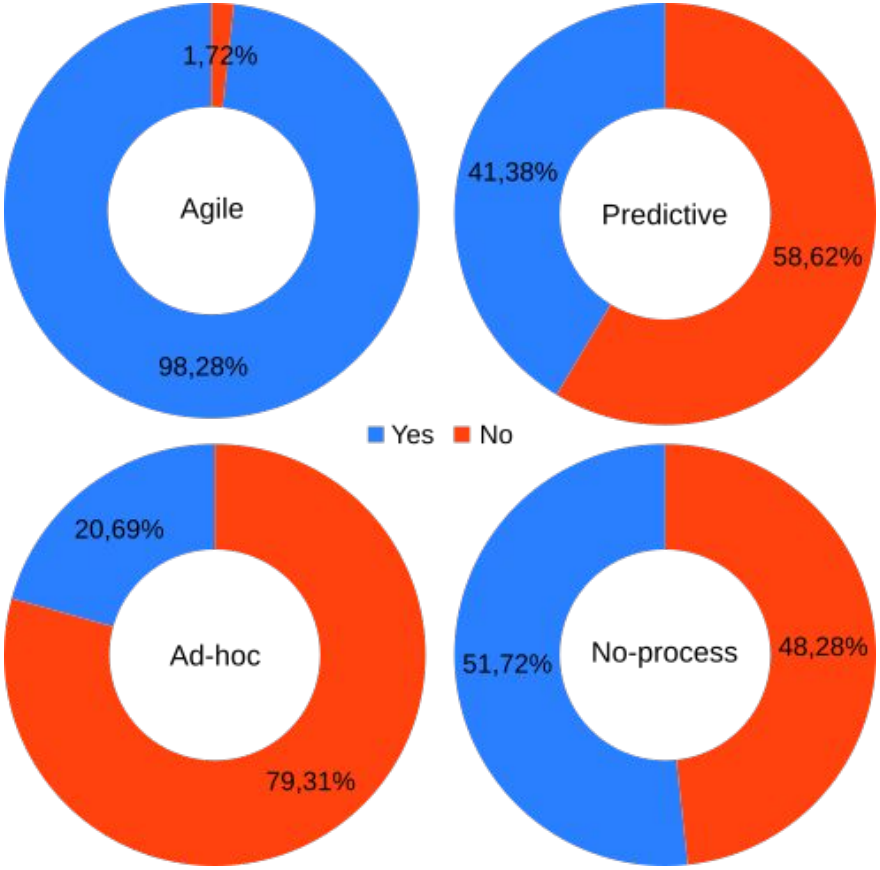
Relation between **process** used and the **problems** faced by developers

Problem	Agile	Predictive	Ad-hoc	No-process	Frequency
Delays	14,55%	20,00%	17,14%	9,20%	60,88%
Unrealistic scope	15,76%	8,57%	11,43%	14,94%	50,70%
Lack of Doc.	9,70%	8,57%	14,29%	11,49%	44,05%
Cutting features	7,27%	5,71%	11,43%	5,75%	30,16%
Design problems	6,06%	7,14%	8,57%	6,90%	28,67%
Com. problems	10,91%	8,57%	2,86%	5,75%	28,08%
Crunch time	6,67%	7,14%	5,71%	8,05%	27,57%
Feature Creep	4,85%	5,71%	8,57%	6,90%	26,03%
Test problems	7,27%	8,57%	2,86%	6,90%	25,60%
Num. of defects	1,21%	1,43%	8,57%	9,20%	20,41%
Over Budget	4,85%	2,86%	2,86%	6,90%	17,46%
Team building	1,82%	5,71%	2,86%	3,45%	13,84%
Loss of Prof.	5,45%	5,71%	0,00%	1,15%	12,32%
Tech. problems	2,42%	1,43%	0,00%	3,45%	7,30%
Tool problems	1,21%	2,86%	2,86%	0,00%	6,93%

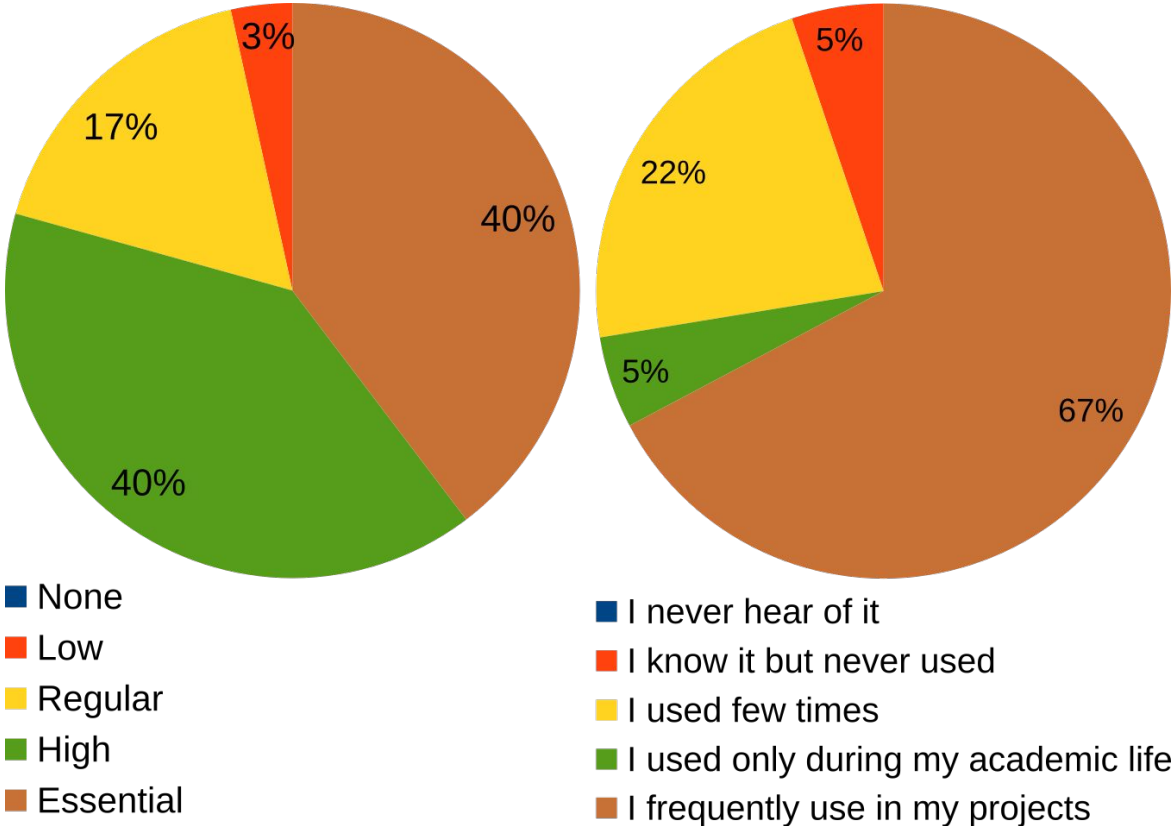
Aggregated data showing the most frequently problems grouped by process type.



Game developers' experience using Agile, Predictive, Ad-Hoc and No-process



(left) How much is the importance of SE in game development.
(right) How frequently SE is used.



Discussion

Correlations between **problems** in each **process type**

Correlation	Agile	Predictive	Ad-hoc	No-process
Agile	100,00%	**79,13%**	60,84%	67,95%
Predictive	**79,13%**	100,00%	62,84%	39,83%
Ad-hoc	60,84%	62,84%	100,00%	**71,35%**
No-process	67,95%	39,83%	**71,35%**	100,00%

Agile appears as (by far) the **most used process** in video game development.

Since its beginnings in mid-2001, the agile culture has been spreading fast and, at a slower speed, game developers are **adopting those concepts**.

The **unpredictability** and **multidisciplinarity** of video game development scenario appears to fit better
in **small cycles** of **continuing delivery**.

Treats of Validity

- The sample analyzed is small and, for this reason, hard to make a generalization.
- Second, the respondents are from different video game groups, expertise, team size, project size, among many others
- Although the data passed by a noise removal step, the answers may contain bias, compromising the statistics

Conclusions

This work presented a **survey** about video game developers experiences regarding software engineering processes.

We sought for **patterns** and **correlations** in **empirical data**, gathered from an online questionnaire sent to Brazilian video game developers.

In this paper we presented **three primary contributions** gathered from developers descriptions of their previous experiences developing video games.

The data shows that, in a Brazilian context, **projects that used a systematic approach, regardless of the type, resulted in better products.**

Although not as accurate as literature argues, **Delays, Unrealistic scope and Lack of documentation are the most common problems faced by Brazilian game developers.**

Moreover, a **correlation greater than 70%** was noted between problems with Agile and Predictive and with Ad-Hoc and No-process.

Future Works

- Extend this work by expanding the scope
- Define a new variables set
- Make use of interviews and other kinds of empirical methods to extract more about video game development processes.

Thank you

Please, consider send me your feedback: cpolitowski@inf.ufsm.br

More about the research: https://polako.github.io/gamedev-process-survey/

For all references and links, please consider take a look on paper.