
Evaluation of a new asset creation pipeline for indie game developers

Christos Fidas

University of Patras
26504 Patras, Greece
fidas@ece.upatras.gr

Nikolaos Avouris

University of Patras
26504 Patras, Greece
avouris@upatras.gr

Dimitris Halvatzaras

Sofar Ltd
G.Klavdianou 22
29100 Zakynthos, Greece
halvid@gmail.com

Ivan Orvieto

TESTALUNA s.r.l.
Via Melchiorre Gioia, 8
20124 Milano, Italy
orvieto@testaluna.it

Abstract

This paper describes the process of evaluating CR-PLAY, a new assets creation pipeline for low budget projects of indie game developers. The paper describes the evaluation method implemented, that involved 9 game developers. The applied method produced ecologically valid results in short time and helped the developers of the new technology to identify major user experience issues.

Author Keywords

Indie game developers, evaluation studies, assets creation process.

ACM Classification Keywords

H.5.m. Information interfaces and presentation K.8. Personal Computing – Games

Introduction

Indie game developers need to produce high quality games with constraint resources in order to survive in the highly competitive game industry today. Indicative of the high competition is that, video game development cycles increased for today's high quality video games, resulting in considerable increase in budgets. Introduction of new tools and methods of work is welcome as this is an industry characterized by high degree of technological innovation, however

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Outline of Evaluation Plan

1. Recruitment of indie game developers
2. Video game scenario elaboration by the game developers – support provided on background and limitations of technology
3. Game developers create assets – critical incident reporting – hot line support provided. They deliver final games/ assets
4. Semi-structure interviews made of 44 questions, in 5 sections: (A) User Profiling, (B) Installation task, (C) Asset Capturing task, (D) Asset Reconstruction task, (E) Asset integration task, (F) Comparison with previous experience/ other games, (G) Suggestions of additional features
4. Focus Group study – Discussion on suggestions for improvements

involvement in evaluation of new tools and methods in this context may create a major disruption given the dire resource constraints of the developers. Given this context, an evaluation study of new tools in the indie game industry needs to be conducted with caution, in order to be successful and produce valid results. This paper outlines the design of such evaluation study and the main considerations involved.

Context of the study

One important part of video games development is related to assets creation e.g. backdrops, avatars, indoor and outdoor objects. Assets creation in video games has become a complex activity involving many roles (e.g. game designers, concept artists, 3D Artists, modelers etc.). As a result, a high percentage of the overall game budget is spent for art design and engineering relating to assets creation. One relatively new approach is to replace the traditional geometric modeling of assets pipeline with image-based reconstruction and rendering of assets [1], captured by photos of real world objects, thus reducing time and cost. CR-PLAY technology is based on this approach [2,3] integrated in Unity3d™, the popular indie game design platform. The task we were given by the developers of the technology was to implement an evaluation plan that will give them a valuable feedback reflecting the views of developers and with suggestions for improvements of the developed tools and technologies. The evaluation had to be done while the tools were still under development. The tools included instructions for capturing photos and then a guideline of use of the technology, and a set of utilities, implemented as plugins of Unity3d for reconstructing the assets and subsequently integrating them in Unity3d. The evaluation was performed in two cycles,

one relating to early stages of technology development, in which the aim was to capture feedback on the main design idea by the game developers world and the second phase, reported here, in which the users were provided with the opportunity to have hands on experience with the developed technology. The degree of freedom provided to game developers during this phase for appropriation of the tools and the findings of the study are discussed in the next sections of the paper.

Evaluation plan

We focus in this section is in the user evaluation, that took into account, the first phase findings [4]. This involved hands on experience with the technology. The game developers used the tools in order to develop their own video game prototypes. The aim was to find out: a) how easy it was for them to adopt the proposed method and tools, b) how easy it was to understand the proposed approach and use the tools, c) how fast can typical users learn to use the tools in order to accomplish certain typical tasks, d) how well the typical tasks (capture, reconstruct, integrate the assets) were supported by the tools, e) how well the terminology used match the game developer's vocabulary and meet their expectations, f) how easily the new assets were integrated in the game engines and modelling tools already used by typical users g) if the tools more cost effective compared to traditional tools, taken into account the quality of the assets produced. The user studies were complemented by an expert evaluation of the tools. Next the 5 step plan, is outlined.

1. Recruitment: The objective was to increase internal validity of the study by recruiting indie game developers from different countries and profiles.

Assets examples



Figure 1. Asset (backdrop) from the “find the spy” game



Figure 2. Assets from the game “Pixel attack”



Figure 3. Asset from the “Mission Patras” game

Incentives were offered to game developers e.g. to give them visibility through the CR-PLAY community. One concern of the technology providers was that the games developed during the evaluation study, may not be of the highest quality and thus produce negative publicity for the tools. This issue was addressed in the non-disclosure agreement signed by the game developers. 9 indie game developers were recruited from which 8 participated in the study until the final phase, based in 4 different countries (Greece, Finland, France, Italy, US).

2. Video game scenario elaboration: Aiming to increase ecological validity of the study, we asked each game developer to propose their own video game development scenario. First they were presented with the functionalities and limitations of the technology. In addition they were shown examples of real video games that had been developed using the CR-PLAY technology. Finally, the proposed scenarios were given for comments to developers of CR-PLAY tools with the aim to assure that they would be compatible with the technology. However this was often overruled. An example is the recommendation for capturing assets outdoors. Despite of this, the 9 proposed scenarios concerned 5 outdoors assets and 4 indoors assets. This showed that indie game developers put high priority to their own objectives, taking the risk not to be able to reach a satisfactory result due to technology limitations. As discussed in the final part of this paper, some of them appropriated the tools in the most creative way in order to proceed with their own scenarios.

3. User based evaluation: During the implementation of the study, we asked the video game developers to work

independently applying a Critical Incidence Evaluation technique [5], relating to positive or negative user experiences that affect task performance and user interaction. A support hot line was available and the interventions where recorded. The tasks that had to be performed were the following: (a) Installation: Game developers installed the CR-PLAY plug-in. (b) Capture: Game developers captured real life assets. (c) Reconstruct: Game developers reconstructed the assets. (d) Edit/Play: Game developers imported the reconstructed assets into Unity5 with the aim to create video game prototypes. Examples of created assets are shown in fig. 1-3.

4. Semi-structured interviews: After completion of the tasks that took the developers between 20 and 50 person hours, an interview was conducted per indie game developer (8 interviews). An interview guide was issued, that contained 44 questions. The structure of the interview was the following: (A) User Profiling, (B) Installation task, (C) Asset Capturing task, (D) Asset Reconstruction task, (E) Asset game integration task, (F) Comparison with previous experience/ other games, (G) Suggestions of additional features. The emphasis was in understanding in detail the positive and/or negative user experiences in using the technology and to elicit recommendations on improvements related to the final release of the CR-PLAY tools. The interview guide was translated to native languages. Each interview session took on average 1 to 1.30 hours. Participants were asked to express their thoughts and were encouraged not hesitate to provide positive or negative feedback. The interviews were conducted by four different interviewers with aim to minimize bias effects.

5. *Focus group study*: The emphasis of the focus group study was to triangulate findings which were derived from the interviews and foster discussions among the game developers who participated in creating the video game prototypes. Emphasis was also given to discuss about enhancements and new features for the final release of the tools.

Observations on plan implementation

The evaluation plan was successfully implemented and the final report was highly appraised by the technology developers who had commissioned it, as it provided them with a thorough insight on indie developers' views and priorities with respect to the new technologies, answering the research questions of the study. To our view the success of this evaluation study, was primarily due to the fact that the indie game developers involved were given a great degree of freedom to decide on the scenarios and follow their own approach, thus supporting technology appropriation [6]. By providing them with the opportunity to achieve ownership of the developed projects and embed them in their own practice and processes, they were motivated to carry on with use of the technology and thus provide us with meaningful comments. This would have been particularly hard to achieve otherwise in this industry in which developers are stressed with time and resources, and not easy to convince to participate in an evaluation study if not in-line with their own objectives. A typical example of the creativity of the users involved is shown in the case of one game developer who defined an elaborate photo processing technique integrating multiple shots of the same scene with different focus ranges, in order to achieve the desired infinite depth of field that was not possible due to space constraints for image capturing. The game developer contributed even

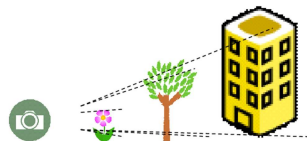


Figure 4. An extract from a guide for image capturing in constraint space created by a developer. According to this, images shot with different focus ranges for near and distant objects are superimposed in a single in focus image

a guide for supporting the approach. An image from this guide is shown in fig. 4

In conclusion, the described evaluation plan of new technology involving indie game developers, based on a critical incident reporting protocol was successful since it cared to take into account the specific characteristics of the vibrant and creative indie game developers.

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