Evaluation of a new asset creation pipeline for indie game developers

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Abstract
This paper describes the process of evaluating of CR-PLAY, a new assets creation pipeline for indie game development working in low budget projects, with limited resources. The paper describes the evaluation method defined and implemented that involved 9 indie 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 work with limited budget and produce high quality games in short time in order to survive in the highly competitive game industry today. Indicative of the high competition is that, as reported in [1], video game development cycles increased from 12 months in the previous generation causal games to up to 36 months 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 evaluation of new tools and methods in this context may create a major disruption given the dire time constraints. 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 findings.

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 agents (e.g. game designers, concept artists, 3DArtists, 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 modeling of assets pipeline with image based reconstruction and rendering of assets captured by photos of real world objects, thus reducing time and cost. CR-PLAY is a new set of algorithms and tools [2,3] to be integrated in the popular indie game design platform and game engine Unity 3d [4]. The task we were given by the developers of the technology was to produce and implement an evaluation plan that will provide them with a valuable feedback reflecting the views of indie developers and with suggestions for improvements of the developed tools and technologies. The evaluation had to be done while the tools where 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 Unity for reconstructing the asset and subsequently integrating in the Unity 3d game development environment. 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 and its use in the indie game developers world and the second phase 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 nature the findings of the study are discussed in the next sections of the paper.

Evaluation plan

We focus in this section is in the second phase of the evaluation plan, as the first phase organization and findings are described in [3]. The plan of this phase 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 game developers to adopt the proposed method and tools, b) how easy it was for a game developers 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 in the tools match the game developer's vocabulary and/or meet their expectations, f) how easily the new assets were integrated in the game engines and/or modelling tools, already used by typical users g) were the tools more cost effective compared to traditional tools for game development, taken into account the quality of the assets produced with the CR-

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Images & Figures: Images

PLAY tools. The user studies were complemented by an expert evaluation of the tools. Next the plan is outlined.

Recruitment phase: The objective was to increase internal validity of the study by recruiting game developers from different countries and profiles. Various incentives were offered to game developers e.g. to give them visibility through the CR-PLAY community or through various dissemination activities etc. One concern of the technology providers was that the games developed during the evaluation process, may not be of the highest quality and thus produce negative publicity for the tools. This issue was addressed by 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).

Video game scenario elaboration: Aiming to increase ecological validity of the study, we asked each game developer to elaborate their own video game development scenario. For reaching this objective, the game developers were presented with the functionalities and limitations of the technology along with a list of typical video game genres supported by the technology. In addition they were introduced to examples of real video games that had been developed using the CR-PLAY technology. Finally, the proposed scenarios were given for commends to technology developers of CR-PLAY tools with the aim to assure that those would be in-line with the supported functionalities of the tools. An observation to be made here is that a recommended was the technology to be used for capturing assets outdoors. Despite of this, the 9 proposed scenarios concerned 5 outdoors assets and 4 indoors assets. This showed that creativity and indie game developers own objectives were first priority of study participants, who did not follow blindly recommendations. 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 asset creation scenarios.

User based evaluation: During the implementation of the study, we encouraged the video game developers to work independently applying a critical incidence evaluation technique, relating to positive or negative user experiences that affect task performance and user interaction. A support hot line was available and their 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.

Semi-structured interviews: After completion of the tasks that lasted between 2-4 weeks, 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 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. Furthermore, the emphasis was to elicit proposals or recommendations on

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improvements related to the final release of the CR-PLAY tools. The interview guide was translated to native languages. Each interview session was audio recorded and took on average 1 to 1.30 hours. Participants were asked to express their thoughts and were encouraged to be as precise as possible. In particular they were asked not to hesitate to provide positive or negative feedback on the themes of discussion. The interviews were conducted by four different interviewers with aim to minimize bias effects.

Focus group study: The emphasis of the focus group study was to triangulate findings which were derived from the interviews but as well to exchange opinions 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 due to the fact that the indie game developers involved were given a great freedom to decide on the task and follow their own approach thus supporting technology appropriation [4]. 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 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, 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 a guide for supporting the approach. An image from this guide is shown in fig. xx

Conclusions

In this paper we described the evaluation plan of new technology involving indie game developers. The evaluation was based on a critical incident reporting protocol followed by interviews and focus group study. The richness of the findings of the study is contributed mainly to the fact that early in the study the users were allowed to obtain ownership of the method and tools evaluated, thus using them in the most creative and often unexpected way. This approach is relevant for the vibrant and creative indie game developers community.

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