

Using AR in Higher Education – suggested use in the Real Estate Agency Study Program

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Abstract—Games, e.g. like Pokémon Go, use Augmented Reality (AR). The functionality that allows one to “see” an object through an application on a mobile phone, can also be used to test out the visual portrayal of e.g. where to put a sauna on a property. It separates itself from Virtual Reality (VR) by being a representation on top of the real world picture. VR portrays a complete virtual reality where all you can see is programmed. Since AR allow the real world to be the basis of the visual image, it provides us with a tool for different uses. Currently one uses AR to organize training for rescue operations at the Inland Norway University of Applied Sciences. Up to four different people can work in the same “world” at the same time with different vehicles; one can drive the police car, one can fly the helicopter, one can drive the ambulance, etc. All of the participants can sit in their own room and watch what the other “players” are doing in the same visual area. This provide the students with unique insight and training regarding e.g. crisis management. However, how can we support the students attending the Real Estate Study Program by using AR? One option is to place a building in an environment in order to “see” it in a particular setting. Can we cater for other needs by utilizing AR? This paper present a pre-study regarding using AR and we will here investigate the different ways AR may support the students in the Real Estate Study Program. We have discussed the use of AR with students and Real Estate Agents that may be our students’ future work places. We have investigated their needs, and have in the paper presented and proposed how AR can be a support in the education in order to support the worklife for our students. We also suggest how data can be collected from the different uses and support Knowledge Management processes in the Real Estate Agencies.

Keywords—Augmented Reality, higher education, relevance of education, knowledge management processes

I. INTRODUCTION

Real Estate Agencies are dependent on people wanting to buy and sell property. It also varies what people are willing to pay for different properties. A sea view property may e.g. sell for more than a similar or even better property without sea view. Understanding the pricing and differences can be difficult enough with real properties that are visible and you can physically enter. Property projects are, however, more difficult to assess. The pricing will depend on the cost of building, type of material, price of land, interior, etc. But it may also be a possibility of refining the costs depending on e.g. views, how much can be customized, etc.

Augmented and virtual reality can aid in the process of visualizing the different aspects. Augmented reality is about placing digital “objects” in a real environment. The most popular example is possibly the mobile game Pokémon Go. Virtual reality (VR) is when all you see is constructed [1, 2]. For both AR and VR tools are needed, for AR a tablet or

phone can be sufficient, for VR it is mostly other types of equipment such as VR glasses – e.g. Microsoft Hololens [3].

This means that by using Augmented Reality (AR) it is possible to place the object or the digital representation of the object (the building project) in a real environment. This increases the possibilities of adjusting and even inviting the customers to suggest improvements. This may also be utilized to furnishing houses and apartments[4].

This opens up for a more customer oriented approach and enhances the possibilities bringing the customer into the development process. This support a value co-creation [5-7] with the customer, and can influence pricing and access.

In this paper we will present the opportunities that lie in the digital tools, before we discuss the effect this may impose on the education of real estate agents and the different Knowledge Management processes in the real estate business. We will conclude with a suggestion for how the use of AR and VR can be implemented in the education of real estate agents.

II. THEORETICAL BACKDROP

A. AR and VR in Higher Education

AR does, in contrast to VR allow the viewer to see the real world [8]. While the VR lets you see a virtual environment and immerse the viewer, the AR allows you to see the real world but “with virtual objects superimposed upon or composited with the real world” [8].

At The Inland Norway University of Applied Sciences, Rena, Norway, we have used AR for educational purposes [9]. In the course “Preparedness training” AR is used to organize and coordinate rescue operations. We have used the tool Microsoft Hololens and hunting radio to communicate. In this course, the students create their own scenario within the scope of a rescue operation. They are then to play staff as another group solve their scenario. After each group have played the other group’s scenario, they provide each other with feedback on both the scenario, learning objectives and execution of both being play staff and players.

The lecturer evaluate the scenarios the students create in the beginning of the semester, and the programmer prepare the scenario for the computers. The programmers create the environment and the different parts that make up the parts described in the scenarios [10].

In separate rooms, the players can organize a rescue operation together as a team, as they are able to see the same objects and move the different objects real time [10].

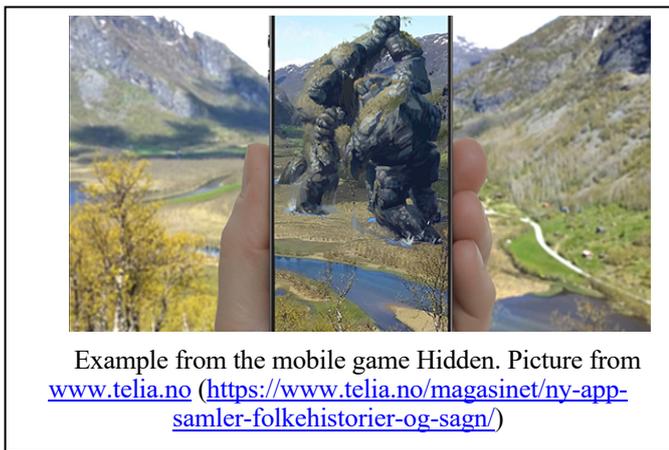
Flight simulators, driving simulators, etc. often use VR as technology base.

B. AR in worklife

“Nye Veier” (translated from Norwegian: “New Roads”) is constructing roads and bridges. At “Nye Veier” they use MS Hololens and Trimble Novapoint (see: <https://www.youtube.com/watch?v=2waFsCD76oc>) to explore how much armour they need in roads and bridges as well as where to place the bus stops and pavements. MS Hololens allows them to calculate how much and what types of armour are needed. They can also see if there is enough view for a bus to let people off safely.

C. AR in Games

We mentioned Pokémon Go earlier, and there are more to come in the foreseeable future. *Hidden* is a game that is under development [11]. It will be a game for spotting trolls and different folk tale features in the nature. They have had people sending in their stories (almost like Asbjørnsen and Moe (here in Norway) or the Grimm brothers (in Denmark)). They have then programmed the visualization of the trolls and other features. It will be a combination of entertainment and edutainment as it will also provide a part of the cultural history of Norway. The app will soon be released and is expected to be very popular.



D. The Real Estate Business

The real estate business is mainly about dealing property and developing property for sales. Property may be flats, houses, or other properties that can be sold and bought [12, 13]. When dealing with property, it is important to understand the market. What are the drivers of prices of a property? It can be about location, facilities, size, quality of materials used, etc. when developing properties; it can be difficult to balance what to include, what does not need to be included, etc. It can be about sea view or closeness to a school, city centre, etc. [12, 13]. The students attending the Real Estate Agency study program learn about which factors may influence the pricing of a property or a property in development.

E. Service Dominant Logic and Value Co-Creation

Some business research has focused on development of products or goods to the development of services [14]. In fact, Vargo and Lusch [14] claim that there has been a “service economy” for much longer and refer to Bastiat [15] that in

1874 claimed that “services are exchanged for services” or what he calls “the reciprocity of services” [15].

Even goods or products are viewed as a form of services and even innovation they claim is “not defined by what firms produce as output but how firms can better serve” [14]. They continue; it is a distinction we make between competing with services versus competing through service” [14].

Bastiat [15] discussed the “value” of a service. It could be either in money, in other goods or in return services. This value may be co-created with the customer. In fact, as Vargo and Lusch [14] claim that a “service centred view is customer oriented and relational”. Hence, the value is co-created with the customer as “the service is defined in terms of customer-determined benefit and co-created it is inherently customer oriented and relational” and “the customer is always a co-creator of value” [14]. In the same article they state that “the enterprise cannot deliver value, but only offer value propositions” [14]. This means that the one that offer the services can determine what they claim to be the value of the service, but it is the independent part – as the relationship with the customer is relational and the customer will be a part of determining the value.

III. METHOD OF INQUIRY

As this is a part of a pre-study, we have not applied for a major research project doing interviews and surveys [16]. Hence, we have only investigated what opportunities there are for going ahead with such a project. We have thus only made inquiries and made our own observation notes [17].

IV. DISCUSSION AND SUGGESTION FOR MAIN PROJECT

Within the scope of the Service Dominant Logic the value of a property may be what *potential* the real estate may have in the eyes of the customer.

Our observation notes show that there is a potential for moving forward with the project and start a research project. The potential for AR in the real estate business may be larger than we first anticipated.

For the real estate business to be able to visualize changes or even offer a view (AR) that can increase the value of the property for the seller. To have the possibility of seeing interiors in a property (preferably their own interiors) in a “new” flat or a “new” house influence on their willingness to buy. Project based properties are properties under development and may not even have populated with built houses. To be able to be at the property and “look” at the units and how they will configure themselves in the area will give the customer a unique possibility of a) “viewing” the properties they are interested in, and b) it may also offer the customers a possibility of influencing the choices before it is all decided.

For educational purposes, to be able to teach the students about these possibilities opens up for a number of different benefits. These students will be updated in the technologies that is available now and may be a part of what increases the income for their companies. Also, they will be encouraged to come up with suggestions to take this further. For instance, the students may suggest adding ranges of furniture in different price ranges, they may add different materials from different suppliers.

From a Knowledge Management perspective, this may also enhance the already well-established relationship the

University have with the Real Estate Business. By developing the course here at the University, it may allow the students to utilize real projects in the course. This cooperation may prove valuable to both the Real Estate Agencies involved and the students, as the Real Estate Agencies can test the suggestions on real customers and the students will be able to use and demonstrate their skills and perspectives. Hence, the course must not only be “hands on” and focused on AR/VR, but also utilize *reflection* to support the learning outcome [18].

A. Suggestions for Main Project

The main project needs to organize for AR programmers to program some generic houses, apartment houses and interiors of houses and apartments. We need to integrate the students in the project and make them take part in the project as participants and informants.

We would suggest to use in depth semi-structured interviews, group interviews and do a survey prior and posterior to the project [17].

The survey prior to the course should disclose their skill level prior to the course, and the survey posterior to the course should not only reveal skill level, but also their attitudes towards using AR as a tool in their future worklife.

V. CONCLUSIONS AND SUGGESTIONS FOR FUTURE PROJECT

Using AR and VR may contribute towards an enhanced perception of customer’s preferences. It may also support enhancing the existing knowledge on pricing an object. By offering the buyers (customers) the advantage of being able to influence on the property, the willingness to pay more, may increase. The customer satisfaction may also increase, which in return will support a positive attitude towards the broker (the real estate agency that sold them “their dream”). Customer satisfaction may also increase the number of new and returning customers.

The impact of being able to understand the value of using AR and VR as tools for enhancing customer experiences, may be a valuable contribution to their education. This will make the students better prepared for worklife and support their abilities to utilize these tools in their work. Also the understanding of the effect these tools may have when offering project prospects, may enhance the collective understanding of pricing and object. It may also increase the knowledge in the Real Estate Business about what customers appreciate and are willing to pay extra for.

A. Further research

The next step is to introduce this as an elective for our Real Estate Agency students at The Inland Norway University of Applied Sciences, Rena, Norway. As one of very few studies within this area, we have the chance of spear heading the utilization of these tools and gain valuable knowledge. At our university, we already use VR for educational purposes and we have access to AR technology developers. We will then conduct a study consisting of quantitative and qualitative approach. We will observe and collect data in order to establish the readiness amongst the students to utilize these tools and investigate if there has been

an increased capability of evaluating e.g. price for project properties.

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