



HHN

HOCHSCHULE HEILBRONN

GECKO INSTITUT  
FÜR MEDIZIN  
INFORMATIK & ÖKONOMIE



TECHNIK

WIRTSCHAFT

INFORMATIK

# Evaluation of Game Engines for Cross-Platform Development of Serious Games for Health

C. Kleinschmidt – GECKO Institut

# Introduction

## ► Benefits of Serious Games

- Improvement in patient compliance [1,2]
- Improvement in learning outcomes [3]

## ► Larger target groups through mobile devices

- Expensive and time-consuming development

## ► Evaluation of Game Engines:

- Facilitate development?
- Raise quality of Serious Games?
- Recommendation for a certain Game Engine?



Source:  
<http://it.santarosa.edu/sites/it.santarosa.edu/files/Smartphones-Laptops.jpg>

# Methods

## ► Systematic research (MEDLINE, ACM, IEEE)

→ No similar evaluation found

## ► Evaluation Scenario

- Serious Game for medical education for Android, iOS and Browser
- Prototype to fully exploit process of development

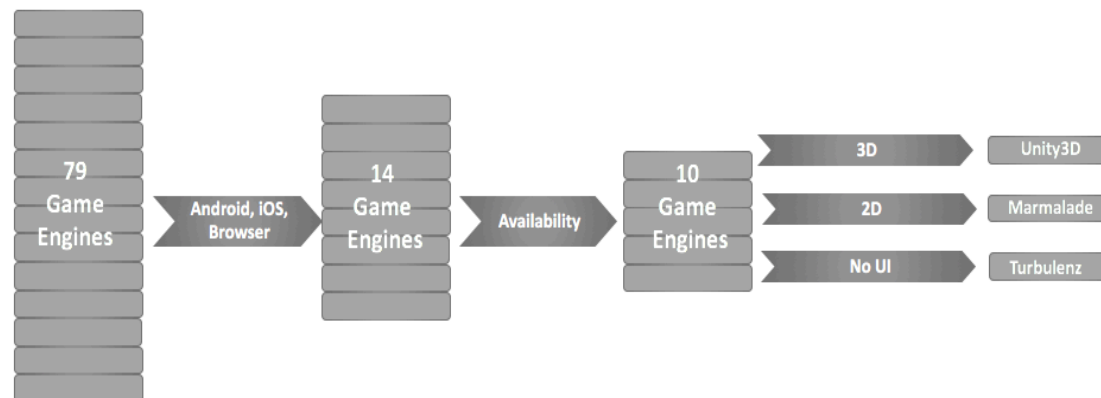


# Methods

## ► Further evaluation as utility analysis

- Aspects and importance rating from development process and software tests of relevant magazines
- End result =  $\sum_{aspects}(points * importance\ rating)$

## ► Process of choosing Game Engines:



# Results

Game Engine	Marmalade	Unity	Turbulenz	HTML5
<b>Cost, License, Installation</b>	202	202	201	190
<b>Cross-Platform Dev., Deployment</b>	377	345	198	138
<b>Specialties</b>	6	3	3	1
<b>Total Points</b>	<b>585</b>	<b>550</b>	<b>402</b>	<b>329</b>

## ► General benefits

- Support in creating and animating scenes
- Support for realistic graphics and sounds

## ► Marmalade

- Management Tool “The Hub” → supports cross-platform Testing

## ► Turbulenz and HTML5

- No UI → Different to handle

# Discussion

- ▶ Marmalade offers best support for cross-platform development
- ▶ Game Engines without UI difficult to handle
- ▶ Significant benefits using Game Engines in development of Serious Games for mobile devices



Source:  
[https://software.intel.com/sites/default/files/managed/4e/57/android\\_engine\\_03.jpg](https://software.intel.com/sites/default/files/managed/4e/57/android_engine_03.jpg)

# Literature

- [1] Kato, P., Cole, S., Bradlyn, A., Pollock, B., A Video Game Improves Behavioral Outcomes in Adolescents and Young Adults with Cancer: A Randomized Trial, PEDIATRICS 122(2) (2008), 305-317.
- [2] Bartolomé, N., Zorilla, A., Zapirain, B., Can Game-Based Therapies be trusted? Is Game-Based Education effective? A systematic review of the Serious Games for Health and Education, 16th International Conference on Computer Games (CGames) (2011), 275-282.
- [3] Boeker, M., Andel, P., Seidl, M., Streicher, A., Schneevoigt, T., Dem, P., Frankenschmidt, A., Uro Islands I – Game-based E-learning in der Urologie, GMS Med Inform Biom und Epidemiol 5(1) (2009), Doc03.