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Gamification in Higher Education

- Toward a pedagogy to engage and motivate students

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Gamification in Higher Education:
Toward a pedagogy to engage and motivate students

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Sammanfattning

Begreppet “gamification” handlar om en pedagogisk ansats som engagerar och motiverar studenter i utbildningssammanhang. Termen gamification (här, ”lek”) associeras ofta till spelsituationer i sport men i den här rapporten ligger fokus hur lek kan användas i kontexter för akademiskt lärande i universitetsmiljö. Rapporten bygger på en reflekterad litteratur-genomgång som speglar uppfattningar och förutsättningar för att använda lek i akademiskt lärande. Genomgången av litteraturen pekar på tre centrala delar som tillsammans utgör förutsättningar för ”gamification”; spelelement, underliggande kontextuell dynamik och praktisk erfarenhet. Dessa tre delar illustreras i tre valda undervisningssituationer, fall som analyseras med avseende på dimensionerna som litteraturen pekat ut som centrala i ”gamification”.

De tre fallillustrationerna utgörs av ett studentprojekt (kaosveckan), ett (Harvard) case och en interaktiv undervisningssituation. Gemensamt för fallillustrationerna är att studenterna har en relativt aktiv roll. I vart och ett av fallen möter studenterna olika utmaningar, som kräver insatser och dialog med kurskamrater och med kursledaren. Det analytiska arbetet sker i en process som belönas av läraren i termer av bekräftelser och utmaningar. Resultatet i alla fallen är beroende på alla parters insatser (studenter och lärare).

Rapporten bidrar till att förklara hur ”gamification” (lek) används i praktiken, ibland i pedagogiska tekniker som har andra namn, t.ex. interaktiv dialog, case-metodik eller projektstudier. Lek stimulerar olika slags lärande, kognitiv kapacitet, kommunikativ förmåga och insikter om normativa processer i en analys. Slutsatserna pekar på att lek kan användas inom ett antal olika pedagogiska tekniker för att höja studentaktiviteten och därmed den upplevda lärdomen av kursmomentet. Lek innebär däremot inte att lärarens roll blir mindre viktig eller resurskrävande. Rapporten pekar på att ”gamification” med fördel kan användas i undervisningssituationer som präglas av interdisciplinaritet och komplexitet.

Summary

This report explores gamification as a pedagogic approach to engage and motivate students in higher education. Gamification is understood here to be the use of game elements in non-game contexts. Here game elements correspond to the characteristics of games, and context is defined as the activity and setting gamified. Gamification is deployed in various contexts such as running, shopping and learning and is therefore an open and multifaceted concept with multiple applications. The report develops a contemporary understanding of gamification with a focus on (higher) education in particular. A framework is derived from literature that categorises game elements as follows: 1) surface elements, 2) underlying dynamics and 3) gaming experience. This framework is used to analyse three teaching activities in marketing and sustainable development disciplines. Case study research was followed to collect data, which were analysed using a template approach.

The analysis shows that gamification is not alien to higher education. Rather, game elements and dynamics associated with the gamification concept are found in higher education. Four game elements are deemed salient in higher education to engage and motivate students in particular, namely: narrative, challenge, progression and feedback. Narrative is the use of stories to engage students in learning, e.g. case study or real-world situation. A challenge is the use of a task that is both challenging and fun. Progression refers to the flow of activities (e.g. tasks) that engage students and maintain their motivation through a learning activity. Feedback is the use of frequent and targeted feedback that encourages students to learn.

Based on these insights a framework was developed to illustrate how gamification might play a role in the development of cognitive capacity, analytical capabilities and normative ambitions of learning. The report concludes that gamification can usefully be deployed in higher education and form a part of the mix of pedagogic approaches. Game elements can be used in teaching sessions to activate students and to motivate proactive engagement in learning activities as well as enjoyment over them. Gamification may not, however, make teaching more efficient and reduce the workload. It may rather help create more effective teaching and contribute to student learning outcomes as well as their overall experience from the university.

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Glossary

Case based learning	an instructional learner-centred approach to teaching in which students engage with a complex problem which does not have a single obvious answer
Declarative knowledge	knowledge about things that can be expressed verbally or in other symbolic form
Functional knowledge	knowledge that can be used by the learner to inform action
Gamification	the use of game elements in non-game contexts
Higher education	Educational level typically offered by universities that follows after secondary education, e.g. high school or gymnasium

1 Introduction

Student education is an important university activity. Effective pedagogic approaches are therefore a priority in higher education to maintain high quality teaching and promote lifelong learning (Biggs and Tang, 2011). Pedagogy is both a discipline and a practice and is therefore both normative and performative. Pedagogy as a discipline covers the theories of teaching and learning. Pedagogy as a practice refers to the doings in teaching and learning and can be defined as "any conscious activity by one person designed to enhance learning in another" (Watkins and Mortimor, 1999, 3). In this report we explore gamification as a pedagogic approach in pedagogic practice to engage and motivate students in higher education.

Gamification involves the use of game elements in non-game contexts (Deterding *et al.,* 2011). Many individuals that play games find them fun and entertaining. Games have many attributes that grab hold of the player and motivate them to keep playing. For example, many games translate a players achievements into points, which in turn often motivates further playing to score even more points. Points and scoreboards are typical game elements that can also be used in non-game environments such as in advertising where firms engage customers in loyalty programmes. Another aspect of games is that they create a sense of agency, control and ownership for users. For example, players often do not passively engage with video games as designers intend (Gee, 2008)). Rather, players actively engage with games, they make things happen and the choices they make throughout the game matter.

While playing games is often seen as a trivial leisure activity, the underlying dynamics of games are the subject of growing interest in marketing, health and education domains as a means of better supporting user engagement (Deterding *et al.*, 2011; Hamari *et al.*, 2014). This interest in promoting game dynamics within 'non-game' environments is now often labelled gamification. Gamification has been shown to hold considerable potential in educational settings: as a means to enhance students' motivation and engagement in the learning task as well as enjoyment over them (Hamari et al., 2014). In many ways, the idea of gamifying educational activities chimes well with writings of the pragmatist John Dewey (1938) in that a motivation to learn fundamentally begins with the curiosity of the student. Indeed, games are intriguing. Thus, drawing on the gamification literature, how gamification can be used in educational settings forms the focus of this report.

1.1 Report aim and objectives

The aim of this report is to explore the use of gamification as a pedagogic approach to engage students and motivate learning in higher education[1]. According to Dicheva *et al.* (2015) gamification is increasingly deployed in higher education contexts and is mostly used in computer science as well as Information Technology (IT) disciplines. In these educational contexts, gamification is viewed as an emerging technology and involves the use of supporting technical infrastructure, e.g. software. Gamification that involves software typically include online applications that engage students in computer based learning activities. In contrast, Deterding (2011) argues that the use of gamification does not necessarily require software. Rather, gamification can be viewed as an approach in practice (e.g. teaching and learning) to create a game like experience.

[1] Higher education refers to an educational level typically offered by universities that follows after secondary education, e.g. high school or gymnasium. It is optional for individual and is the final stage of formal learning.

In this report, we follow Deterding to explore the use of gamification in practice and not gamification as a technology that involves software. The following Project Objectives (PO) were formulated:

PO1 To develop a contemporary understanding of gamification and its deployment in higher education, with particular focus on marketing and sustainable development disciplines.

Marketing and sustainable development disciplines were selected because teaching in such educational contexts is very different from computer science and Information Technology (IT) disciplines where gamification is typically used. Marketing and sustainable development are interesting disciplines and involves teaching different ways of understanding social behaviour, e.g. how people or a firm behave. How gamification might work in such context is objective 1. To address PO1, a literature review is completed and identifies game elements that can be applied in teaching and learning contexts (PO2).

PO2 To select 'elements' of gamification that can be applied to promote efficacious pedagogy in teaching and learning contexts

Having identified a contemporary understanding of gamification and identified game elements, the next PO is to identify how gamification can work in teaching marketing and sustainable development disciplines (PO3).

PO3 To present learning situations in higher education where elements of gamification have been effectively used

Having presented learning situations in marketing and sustainable development disciplines, the next PO reflects on how gamification might contribute to learning and factors that may enable further its use (PO4).

PO4 To identify aspects of gamification to consider for further deployment in higher education

1.2 Approach and report structure

Since relatively little is known about gamification in educational settings, an exploratory approach served the needs of the project. Literature on the gamification concept was reviewed to create a state of the art view of gamification and the various contexts in which it has been promoted. The results of this literature review are presented in section 2, which offers an overview of the gamification concept; a number of game elements that can be used in non-game contexts, such as education, corporate activities, sustainability initiatives, health and many more. In aggregate the literature review shows that gamification is a diverse phenomenon and posits the view that gamification is an open and multifaceted concept with multiple applications.

An analytical framework based on salient attributes of the gamification concept was developed from the literature review. Based on the attributes of the gamification concept, this framework is used to analyse three cases of real teaching situations in marketing and sustainable development disciplines. The cases were developed to help illustrate the potential

and relevance of gamification in higher education and are outlined in section 3. Teaching situations forming the basis of the case studies were selected because of the creative and interactive approach to motivate and engage students taken in them.

Case study research is frequently conducted to study phenomena that cannot be easily separated from their context. Thus a case study research methodology was followed to explore gamification in teaching contexts. Consistent with the canon of case study research, data were collected from multiple sources (e.g. literature, teaching situation and student evaluations) using multiple methods including participant observation. Data were analysed following Miles and Humberman's (1994) template approach, with the initial template populated by among other things, game elements derived from literature. Analysis is presented in section 4, with a discussion and conclusions provided in section 5.

1.3 Learning and teaching

Pedagogy refers to the theories and concepts of how teaching and learning proceeds in practice. Finding effective pedagogic approaches is a priority for higher education practitioners seeking to maintain and further develop high quality teaching. There are various approaches to teaching differentiated by their focus. Biggs and Tang (2011) identifies three approaches to teaching.

- *What the students are*: in this approach the teacher display information to the students, and the students role is to absorb and learn from the information
- *What teachers do*: in this approach the teachers role is to explain concepts and principles to the students, who in turn need to develop various skills to learn these
- *What students do*: in this approach the focus is on the student and what they do to engage with learning activities and achieve intended learning outcomes

The above framework focuses on the role of the teacher and students in learning. To improve teaching and learning in higher education Biggs and Tang (2011) argue that universities should shift their focus from the teacher to the learner and define what learning outcomes students are meant to achieve. In other words, universities should promote teaching approaches that focus on *what students do* to learn.. A framework for how students learn is therefore needed to understand what students do.

Biggs and Tang (2011) suggest two approaches to learning; these are surface and deep learning. The surface approach to learning involves a low level engagement in learning activities, e.g. memorising facts. For example, students may learn selected content and memorize these to give the impression of understanding. Learning gained from the surface approach include the ability to memorise and paraphrase content. Deep approaches, on the other hand, require a higher level of engagement in learning activities whereby students achieve a deeper form of understanding. Learning gained from deep approaches includes the ability to memorise and paraphrase content as well as abilities to explain, hypothesise, apply knowledge gained and reflect.

Focusing on the learner and what students do may motivate students to engage in deep approaches to learning. In such instances, outcome based learning becomes a priority that guides development of pedagogies in universities. Here, the outcome is the student's total university experience and includes the development of professional skills, communication skills, problem solving, creativity, team work and so on. Thus, the focus in teaching is not

only on what subject to teach, but fundamentally, what outcomes students are meant to have achieved as part of a course or an academic program.

Thus, focusing on the role of the student at universities is fundamental to achieving intended learning outcomes. The teachers, and indeed the university's role, is to support and encourage deep approaches to learning. Healey (2005) offers a model for learning based on the teacher's role and focus of a learning situation (Figure 1).

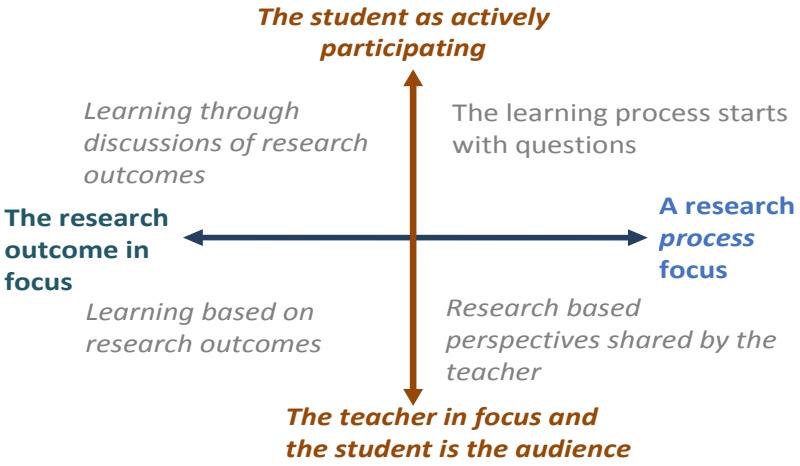

Figure 1: Student role and learning outcomes in different learning environments (Healey, 2005, 70).

A *teacher in focus and the student as an audience* might be a basic (A-level) class where key concepts and models are taught with learning objectives related to developing a vocabulary in the subject. A *more active student role* typically implies that the student may lead discussions, contribute by selecting reading materials and a situation where the student has an understanding of the subject. Focusing on the *materials* (research outcomes in advanced classes) or on a *process* (development of skills) is in part determined by the learning outcomes for the course and the program.

Choices that course leaders make about how a course may be taught are framed by learning objectives, teacher preferences as well as forms of examination and budget constraints. In higher education much of what is taught relates to ongoing knowledge accumulation and development. Here the important role for teaching is to make learning fun: fun to investigate phenomena; and fun to actively develop new skills. Seen this way, teaching and learning can be described as co-creation of value, where both teacher and students have major roles.

Given a dominant position where the teacher makes many pedagogic choices *ex ante* assigns responsibilities to the teacher to create learning environments that are motivating and engaging as well as encouraging. In such learning processes, students may be motivated to initiate learning and maintain their motivation during their activities. Students that are highly motivated may also show a corresponding high level of engagement in their learning activities, which in turn can provide them with a deeper form of understanding. Students that are less motivated and has a surface approach to learning may need encouragement to enter a virtuous cycle of deep learning. This is where gamification may play an important role: as a means to motivate and engage students.

2 Literature review – "gamification"

This chapter provides the findings from a literature review on gamification, with particular reference to game elements and their use in education contexts.

2.1 A definition of the gamification concept

Gamification can be defined as the use of game elements in non-game contexts (Deterding *et al.*, 2011). In this definition, Deterding et al. makes a distinction between gaming and playing as well as game and game elements to conceptualise gamification (please see Figure 2). Following Caillois (2001), playing is different from gaming and involves unstructured and improvisational activities, e.g. playing with toys. In contrast, gaming encompasses activities that are more structured by rules and with some form of goal attached. For example, completing missions as part of a video game. In such instance, a game exists as a whole and seen as a proper game.

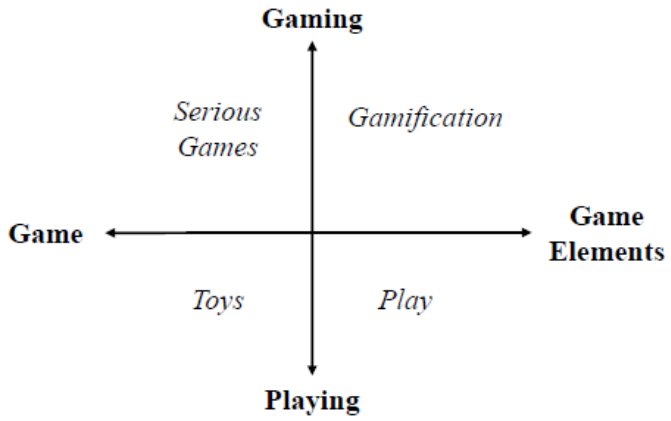

Figure 2: Gamification in relation to gaming, playing, proper game and game elements (adopted from Deterding *et al.*, 2011, p.5).

While gamification relates to gaming it is not about turning an activity into playing nor is it about developing a game, e.g. a video game for learning. Rather, gamification is about using game elements in non-game activities (e.g. running or learning) to create a game like experience in such activities. *Game elements* are particular attributes that are characteristic to games. Reeves and Read (2009) identify typical ingredients of great games such as narrative context, levels, feedback, time pressure and competition. Games are performed under rules that are explicit and enforced. Since each of these elements can also be found outside of games, it is difficult to delineate game and non-game elements.

Gamification is applied in various contexts such as education, health, business and sustainability (Deterding, et al., 2011). By implementing game elements, initiatives undertaken in these contexts often aim to influence how people behave when they learn, exercise and shop. As such, gamification can be applied to 'nudge' people to do things they would otherwise avoid (Mont *et al.*, 2014). For example, in the Volkswagen funded initiative called the Fun Theory, a staircase at Odenplan in Stockholm was fitted with piano-keys, which made a piano like sound when stepped on (thefuntheory.com, 2009). The aim of this

installation was to encourage people to use the stairs instead of the escalator. The initiative showed that people used the staircase instead of the escalator, sometimes running up and down it several times because it was a *fun* thing to do. While this may be a trivial example of gamification, it shows the potential of this concept to shape behaviour. As such, gamification is variously deployed to promote desirable actions and behaviour.

Having introduced the gamification concept, the next section focus on game elements.

2.2 Gamification and game elements

A variety of game elements are articulated in literature (Dicheva *et al.*, 2014; Hamari et al., 2014; Stott and Neustaedter, 2013; Erenli, 2013; Deterding *et al.*, 2011; Lee and Hammer, 2011). In this literature review, game elements are categorised in terms of surface elements, underlying dynamics and gaming experience. Each category is defined in Table 1.

Table 1: Game elements

Type of game element	Meaning
Surface elements	Game characteristics that are visual and tangible, e.g. a badge.
Underlying dynamics	Game characteristics (elements) that encapsulates the underlying dynamic or conditions for a game, e.g. narrative
Gaming experience	Game like experience created in a gamified activity, e.g. competition

Game elements identified from literature with particular reference to (higher) education are presented subsequently.

2.2.1 Surface elements

Common game elements are point systems, badges and leader boards (Hamari *et al.*, 2014). These elements are typically used in games to quantify and visualise the performance and/ or achievements of individual players. Points systems and badges are also applied in other settings. For example, many firms have successfully deployed gamification as part of their marketing strategies to engage customers in loyalty programmes, e.g. frequent-flyer programs and bonus programs such as Nike+. In such instances, customers earn points through shopping and they are rewarded for their efforts.

Badges are graphical symbols which show that the wearer has acquired a skill. For example, children learning how to swim in Sweden are often rewarded with a badge. Figure 3 shows badges associated with swimming. Both points and badges are a form of reward for achievement. Badges can provide a sense of pride associated with an acquired skill. Badges can also be an important aspect of a community (e.g. football club) to show membership and create a feeling of being part of a group.

Figure 3: A swim bade board with badges.

Point systems and badges are tangible game elements and can be represented in progress bars or leader-boards. Progress bars can be useful to provide feedback to the individual user on their progress toward attaining a skill. Leader boards, on the other hand, can be used to compare individual users and rank these against each other. As such, points and badges may be useful to communicate progress (attainment) and acknowledge effort. Thus these game elements can be deployed in a situation or activity (e.g. shopping, training) as a reward mechanism and to make the activity more engaging, fun, competitive and/ or challenging.

In their review of gamification in education, Dicheva *et al.* (2011) found that the most commonly used game elements are points, badges and leader boards. While points and badges represent a common game element in non-game settings, they may not automatically add value to educational settings (Lee and Hammer, 2011). In many learning processes, points and badges are already in place. For example, student performance in tests is often translated into points and the overall achievement in a course graded accordingly.

The use of point systems and associated elements (e.g. leader-boards) have also been criticised for limiting the potential of gamification. Robertson (2011) conceptualises the use of points and badges as pointification and argues that such game elements are the least essential element of games. Also, focusing on points and badges when gamifying an activity may blur and constrain the potential of other useful and interesting elements that games may offer. Indeed, Dicheva *et al.* (2011) argue that for gamification to gain momentum in educational settings new ways of applying gamification are needed that go beyond points, badges and leader-boards.

In their analysis of gamification in education, Stott and Neustaedter (2013) look beyond tangible game elements (e.g. points and badges) and focus on how education can benefit from the underlying dynamics that make games engaging. They identify the following underlying dynamics from game design that can be applied to learning environments, these are: freedom to fail, rapid feedback, progression, narrative and storytelling. Game elements other than points and badges are therefore explored below to provide a rich picture of gamification.

2.2.2 Underlying dynamics

This section explores dynamic elements of games; these are 1) freedom to fail, 2) feedback, 3) progression, 4) narrative and story-telling, and 5) choice. Each of these game elements are further discussed below.

The first element is **freedom to fail (1).** In many games players often have multiple “lives” to succeed, which allow them to experiment without fear of causing irreversible damage. For

example, when failing to successfully complete a session, players can start again at the most recent checkpoint. This game element can be deployed in educational settings to create a 'trial and error' dynamic in learning to enhance student engagement (Kapp, 2012; Lee and Hammer, 2011). For example, such elements may be used to encourage students to explore topics, make decisions on what aspects to explore, and crucially to expose the consequences of making poor decisions (Kapp, 2012). A trial and error dynamic in education can also allow the student to focus on the process of learning rather than the end-result. Used differently, however, freedom to fail presumes no penalties for poor task performance, e.g. allowing students to resubmit assignments.

This freedom to fail element may therefore work well *during* teaching as part of a course but not at *the end* of a course. At the end of a course students are typically assessed and graded in terms of how well the students have learned or if they have failed the course. Such assessment I known as summative assessment and is carried out by the teacher after teaching has concluded (Biggs and Tang, 2011). During teaching in a course, however, freedom to fail may work well as a form of formative assessment.

To involve feedback given to students during learning: the teacher informs students how well they are doing and what they need to improve. Feedback can also be given by the students to the teacher and it is therefore an interactive two-way process. Formative assessment works well when feedback is used constructively. This means that students should be offered opportunities to reflect and act on errors while learning and bridge the gap between where they are and where they should be. For the teacher, formative feedback can be used to modify their teaching approach, e.g. to tailor teaching to specific needs. While this freedom to fail element is an approach to enable feedback between students and teacher, how feedback is provided forms an additional element.

Feedback (2) is a common element in education as well as in games. In education, feedback is important in a learning process and may fulfil different roles such as to provide encouragement, advice, challenges and general confirmation in the learning process. In games, feedback also work to encourage and inform the player about their performance and progress through a game. Feedback in games, however, tends to be very frequent and targeted compared to that of feedback in education (Kapp, 2012). Thus, feedback as a game element can be used in education to promote frequent and targeted feedback to students.

Closely related to feedback, a key feature of gamification is developing an understanding of learner **progression (3).** A typical game element is a progress bar that can be used together with a point system to inform the player about their performance and achievement throughout the game. Used differently, however, progression can also be used in a game to inform players about their development and sense of direction through the game, e.g. game level or mission. In many games, players have to complete a task (e.g. win a battle or resolve a puzzle) to access the next level. Moving from one level to the next is often called *levelling-up.* This approach is deployed in Virtual Learning Environments (VLE) where a quiz or a test is given to the student to complete as part of a course (JISC, 2015). Successful completion of a test is generally required to continue or 'unlock' the next level of a course.

Progression can also be used in a game to sequence events that gain and retain players' attention (Kapp, 2012). This idea of progression, as a sequence of events, was deployed in a course on Teaching With Technology at the University of Arizona (Lee, 2012). Progression

was used here to allow the student to move from one learning objective to another. Indeed, learning objectives can be organised to assist progressive skills development:

1) identifying, understanding and remembering
2) analysing, evaluating, critiquing and summarising
3) composing, creating and planning.

This progressive learning format encourages students to identify and understand concepts and then move on to a level where they require further skills to analyse and apply concepts as well as make connections between them. The benefit of this progressive learning process is that the student, if successful, will gain skills in the earlier parts of courses needed to complete latter parts of it. This approach closely relates to the different kinds of learning objectives in Bloom's taxonomy (1956). This 'classic' model on learning is depicted in Table 2.

Table 2: A list of verbs related to learning outcomes in different levels of intended understanding (Biggs and Tang, 2011, 124)

	Declarative knowledge	*Functional knowledge*
Unistructural	Memorize, identify, recite	Count, match, order
Multistructural	Describe, classify	Compute, illustrate
Relational	Comare and contrat, explain, argue and analyse	Apply, construct, translate, solve near problems, predict some domain
Extended abstract	Theorize, hypothesize, generalize	Reflect and improve, invent, create, solve unseen problems, extrapolate to unknown domains

The above list has been revised and modified (Andersson and Krathworl, 2001; Biggs and Tang, 2011, 124) to clarify the difference between declarative and functioning knowledge. Declarative knowledge is knowledge about things that can be expressed verbally or in other symbolic form. For example, knowledge that the teacher 'declares' in a lecture or information that is 'declared' in a book. Functional knowledge is knowledge that can be used by the learner to inform action. For example, professionals (e.g. an engineer) may use theory to inform decisions on what to do in a professional context, e.g. building a bridge.

Narrative (4) is what most games employ such as an overarching story of the game. Narratives are extensively used in games to engage the player through fantasy and suspense (Mont *et al.*, 1999). For example, in Space Invaders (one of the earliest video games) players defeat waves of aliens to earn points. Langer *et al.*, 2013 explores the use of narratives or stories in gamified applications, e.g. smart phone apps. For example, the smart phone app called "Zombies. Run!"[2] can be used to make running fun. Indeed, the narrative is used to motivate people to do more running.

A narrative can also be built on the principle of progressive disclosure. Rather than try to present a user with a complex situation, narratives can be used to guide the user through these. In educational settings, a progressive story can be used that moves from simple to complex. In

[2] For information on the running game, please see https://zombiesrungame.com/

such processes, the student is guided through a learning process and gradually encounters increasing complexity.

Narratives can both engage and motivate users, e.g. game players or students. For example, a good story can motivate players in a game to uncover what has happened or anticipate what will happen next in a game. Narratives can also promote **role-play**, by which players in a game can choose a character and interact with other players/ characters in the game. As such, games also promote social interaction.

In education, case studies after often used to provide narratives in teaching. These reflect real-world situations and used to motivate students to explore a subject matter more thoroughly and to link theories with complex realities (Mark-Herbert, 1999). Stories also form a foundational element of learning to create meaning and understanding. Providing a story as part of teaching can put learning into a realistic context. Kapp (2012) argues that people learn facts better when these are presented as a part of a story rather than as an abstract list of bullet points.

And last, but not least, the fifth element, **Choice.** In many video-games (and other games) players can choose a character in the game. Furthermore, players may also choose their path through a game. This idea of choosing charactering and/ or path through a game can also be applied in non-game contexts, e.g. educational settings. For example, in a course on Information Studies at the University of Michigan, students were presented with different assignment options, labelled quests, to which the students could choose from (Stott and Neustaedter, 2013). The quests were also organised into levels where higher level quests are not available to students until they have completed lower level quests. As such, the choice element can also be applied in an educational setting to open up various options to achieve identified learning objectives.

Having the option to choose an assignment, or the opportunity to influence the assignment type, could be useful for students since they are diverse (Biggs and Tang, 2011). For example, students have different capabilities and preferences and may prefer writing instead of talking. Thus multiple choices can open up various routes to learn but still achieve indended learning objectives. Please see Figure 4.

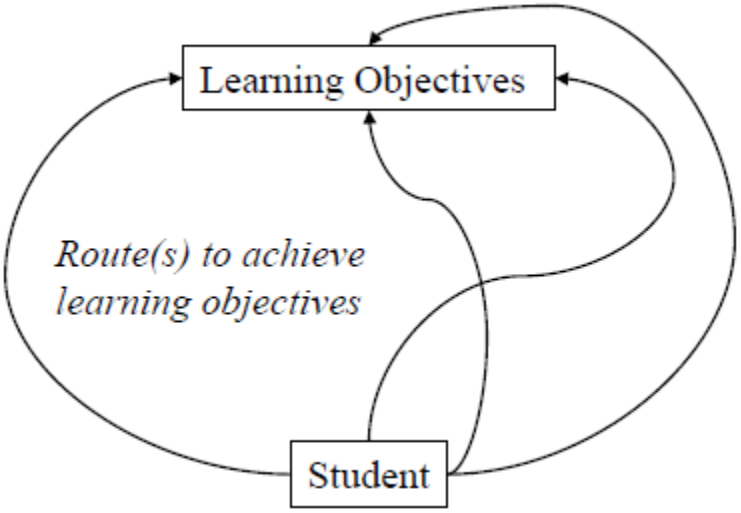

Figure 4: Multiple choice and routes to learn.

In a top-down learning process, the teacher identifies both the learning objectives and the route to achieve these: the student is guided on a predefined path to achieve their learning objectives. An alternative is an interactive process that is both top-down and bottom-up, in which the teacher identifies learning objectives, but offers the students various routes to achieve these.

This section has identified various game elements that reflect the underlying dynamic of games; these are freedom to fail, feedback, progression and choice. The next section presents game elements that create a game like experience among particpants in non-game environments.

2.2.3 Gaming experience

Gaming experience is a third category of game elements identified from the literature on gamification. These are game elements that create game like experiences for participants in non-game activities, e.g. challenge, competition and enjoyment.

Games typically challenge players to complete difficult tasks or missions (Koster, 2004). Players are challenged by an array of tasks which become increasingly difficult as the game proceeds and the player's skills develop. In education, students are also challenged with tasks e.g. reading or writing assignments. Challenges are therefore not unique to games; they can also be used in education settings to engage students in learning activities (Bandura, 1986).

Many games involve some form of competition that engages and motivates the player to compete with other players. Competitive elements are also found in non-game environments. For example, firms can engage their customers in a competition to write a slogan for a new product. Finally, games are fun and players enjoy playing them. As such, enjoyment is an important attribute of games that proponents of gamification hope to promote in various settings.

An overview of gamification and associated elements found in literature reviewed is presented in the next section.

2.3 Gamification elements – an overview

This section summarises the findings from the literature review. Table 3 identifies game elements and how they can be used in teaching and learning situation.

Table 3: Game elements, contexts and practical use

Game elements	Meaning in game context for players	How it can be used in a teaching and learning situation
Points, badges and leader-boards	To quantify and visualise a players performance and/ or achievements	These elements can be used in addition to marks and grades to quantify and visualise student performance
Trial and error	Game players have multiple-lives, which allow them to play again and again	It can be used to encourage learning by allowing the student to explore a topic, make analytical decisions and be exposed to the consequences of decisions made
Feedback	Game players tend to receive frequent and targeted feedback related to their performance and/or achievements through the game	While feedback is common in teaching, the use of frequent and targeted feedback during learning (i.e. formative assessment) may enhance students motivation in a learning activity
Progression	The use of game levels or sequence of missions informs the player about their progression in a game	Can be used in teaching to inform the students about their progression, e.g. presenting students with progressive learning objectives with increased difficulty
Narrative	The overarching story that grabs hold of the player through the game	Stories (e.g. case studies or scenarios) can be used in teaching to make links between theories and real-world situations
Multiple Choice	Game players can select between various paths, including level of difficulty, when playing a game.	In a teaching situation, multiple choice can be presented to students to select a path appropriate for them in achieving their learning objectives
Role play	Game players can choose both character (who they want to be) as well as selecting a path to complete a game	In a teaching situation, students can be asked to take on different roles to encourage discussion and debate
Challenge	Game players are challenged with difficult tasks	In education, students are challenged with tasks that engage them to learn
Competition	Many games allow game players to compete with each other	Competition can motivate students to learn
Enjoyment	Games are fun	Learning can be fun

The literature reviewed on gamification show that there are multiple game elements, which have been variously deployed in different contexts (e.g. business marketing, sustainability initiatives and education) to achieve a number of effects. In education (including higher education) the most commonly used game elements are points, badges and leader boards (Dicheva, *et al*. 2014). These game elements are tangible and often used in non-game contexts to visualise the performance of participants in a gamified activity. The literature on gamification also identifies game elements that reflect the underlying dynamics and/ or conditions of a game, e.g. freedom to fail, feedback, progression, narrative and multiple choice. These game elements are categorised in this literature review as the *underlying dynamic of games.*

A third category of game elements are those that create a game like experience for participants and include competition, challenges, and enjoyment. Many games create a sense of enjoyment because they are fun and challenging as they may also involve a form of

competition. Such characteristics are important features of games that engage and motivate players to persevere with and progress through a game.

From the literature on gamification we identified several game elements. These are organised into three categories: surface elements, underlying dynamics and gaming experience. This framework is depicted in Figure 5.

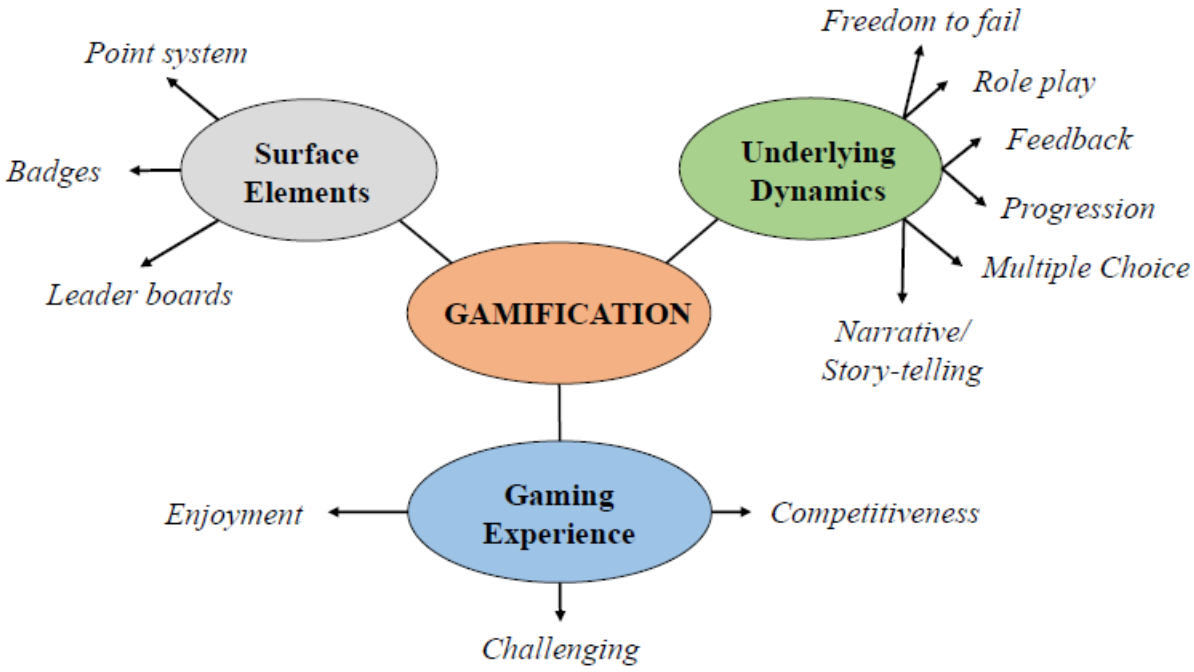

Figure 5: Gamification framework: surface elements, underlying dynamics and game effects.

While there are multiple game elements and attributes, this does not mean that a gamified activity needs all game elements to be present. Rather, this framework offers an overview of the various game elements found in literature.

In their analysis of gamification in education, Stott and Neustaedter (2013) found that the concept is already recognised and used in modern pedagogical practices. This suggests that gamification is far from novel in such settings.

Much of the empirical examples of gamification and its use in educational contexts focus on purposively gamified teaching activities in computer science and IT (Dicheva *et al.*, 2015). Following Stott and Neustaedter (2013) there may also be teaching situations that are not developed with the gamification concept in mind but share common ground with this concept. Based on this view, below we present three empirical illustrations of teaching situations from marketing and sustainable development disciplines in which game elements are deployed to engage and motivate students in learning activities.

3 Empirical illustrations

Based on the idea that gamification is already embedded in modern pedagogical practices, we identified and observed three teaching situations. The selected teaching situations are as follows:

1) Chaos Week: a project management class offered to engineering students at Uppsala University, Sweden (3.1)
2) Case based learning – The tiger shrimp case (3.2, Appendix B)
3) An interactive lecture on Innovation and Sustainability (3.3)

These teaching situations are not purposely gamified, i.e. the proponents of these courses (e.g. the lecturer) has not drawn on the gamification literature to develop their course. Rather, these teaching situations were selected because they deploy an interesting and creative approach to teaching that encourages interaction between the teacher and students; and are much appreciated among students according to student evaluations.

The three empirical illustrations are described below.

3.1 The chaos week

At Uppsala University, engineering students in their third year complete a class where they draw upon knowledge and skills gained from participating in previous courses and develop project management skills. Contrary to most classes that begin with "these are the objectives and this is the structure for the course", students are greeted with instructions to keep the entire week open in their calendar; the course will require full day efforts. The chaos week starts on day one with a challenge and ends on day five with synthesis and reflections.

Day one: introduction with a challenge
This project management course has about 60 students. The following information is presented to the students on day one: "We are going to do a role play where the teachers represent a corporation, Gotland2050, in search of a consultancy firm that can present a water plan for the southern part of Gotland. After the introduction, the course leader alters her appearance slightly to get into her role. She then offers the following information to the students detailed in the text box below:

"Hello, I am Emma Blixt and I am responsible for investments in our firm, Gotland2050. Our company has a longstanding collaboration with a number of the municipalities at Gotland and we want to maintain our good reputation– keeping in mind the interests of the permanent residents as well as the summer guests. Our previous engagements have covered construction of homes in, for example, Visby, Tofta and Gnisvärd.

I have invited all of you (representatives of consultancy firms since you have expertise in water engineering) here today because I think you might have what it takes to make us an offer for a water management plan for Storsudret, where a housing development project is proposed. Our plan is to use your water management plan as a part of our sustainable housing plan for Storsudret, which will be presented for Region Gotland next month. A key feature of the water management plan is that the area needs to be self-sufficient from a water management perspective.

We look forward to hearing your presentation of the suggested plan at our planned meeting tomorrow. The presentation may take a maximum of 10 minutes".

The information is also offered in a written statement. Students are divided into groups of 5-6 students and given a schedule for when their group is expected to present a draft management plan on the following day. Having a challenging task on the first day of the course is unusual for students. Therefore there is initially confusion among the students before they start to form groups and work on the task. The student groups are labelled "consultancy firms" hereafter. The course leader (also taking the role as Emma Blixt) offers limited opportunities for the students to consult with her about the task.

Day two: presentation

On the second day of the course the "consultancy firms" complete a 10 minute presentation to a "board of directors" responsible for Gotland 2050. The board of directors comprises a CEO responsible for investments (Emma Blixt), a marketing manager and a senior consultant that has significant expertise in water projects. These corporate representatives, all in suits, greet "the consultants" and listen attentively to a 10 minute presentation. During the presentation feedback is provided by the corporate representatives to the "consultancy firms" as positive nods and questions for additional information. Notes are also taken by the corporate representatives during the presentation.

Having met "the consultancy firms" feedback on the presentations is provided by the course leader (also playing the role as Emma Blixt). The feedback is structured around criteria for evaluating the water management plan developed by the student groups. These criteria includes documentation, how well the group presented their firm, legal aspects, financial aspects, the quality of the suggested technical solution, trustworthiness and information about the assumptions which underpin the plan. In this way, the students develop a gradual understanding of the grounds for evaluating their water management plan.

Day three: traditional teaching

With the experiences from the role play sessions on days one and two, day three offers traditional lectures about project management. During these lectures theories and concepts about project management are presented that connect with the practical experience from days one and two.

Day four and five: Challenge and Reward
With the experience of the chaotic process in the first sessions (days one and two), and a day of lectures (day three), students are then welcomed again by Emma Blixt. On day four new groups are formed into "consultancy firms", and a new task is given to the students (Technically, the task can be the same or be altered. Both alternatives show the same results). At the end of day five, when students have had a second chance to make a project proposal for the board of Gotland2015 they are, again, given feedback on their presentations. In addition, all students are gathered for a full class seminar in which the criteria for evaluation are clarified, the scores are shown and a winning group identified, which is rewarded with a small symbolic gift. The statistics from the evaluation in day 2 and day 5 are also shown – pointing to the fact that all groups have improved.

Drawing on Biggs and Tang (2011), it can be observed that the learning outcomes of chaos week are both declarative and functional. In the practical encounter of a problem that has to be resolved within a short time, students have to engage in a process that gives them 'hands on' experience and ultimately, project management skills. Theories of project management are discussed in traditional lectures to inform students for their second practical task. This allow students to learn project management from both practical experience and theoretical insights.

Course evaluations indicate that this week is widely appreciated among students. Importantly, it motivates students to actively engage in the course. The initial challenge combined with the use of role play makes it easier for the students to relate practical experiences to theories and concepts of project management.

3.2 Case based learning

Case based learning builds on Problem Based Learning (PBL), which draws on the work of John Dewey who contended that education begins with the curiosity of the learner. PBL is an instructional learner-centred approach to teaching in which students engage with a complex problem which does not have a single obvious answer (Hmelo-Silver, 2004). PBL is therefore also a form of self-motivated learning. Self-motivated learning is a process in which the learner has to identify what they need to know to solve a problem, apply their new knowledge, and reflect on what they have learned including the effectiveness of the methods they select for solving a complex problem.

PBL has much in common with case-based learning and project-based learning. In case-based learning, a case study can be used that will help the learners to understand key characteristics of a problem situation (Mark-Herbert, 1999). Case studies are also useful in that they allow a student to link theoretical frameworks, concepts and ideas to real-world situations and build discipline and context specific vocabulary (Erskine, Leenders and Maufette-Leenders, 2003). In project-based learning, students can work together and collaborate to achieve a shared goal, e.g. a project.

An example of using a case study in teaching
In Appendix A, a case study is presented as an illustration, an example of a problem based pedagogical approach. It is based on a situation where a focal individual needs to make a decision of some sort. Students are given case materials, along with instructions to guide the individual, first part of the analysis. After individual preparation, students meet in class where

small groups share their individual analysis, as preparation for a full class dialogue. The teacher participates in the class dialogue and students are encouraged to support each other for continued shared analysis. The last step in the analysis is a full class dialogue (Figure 6).

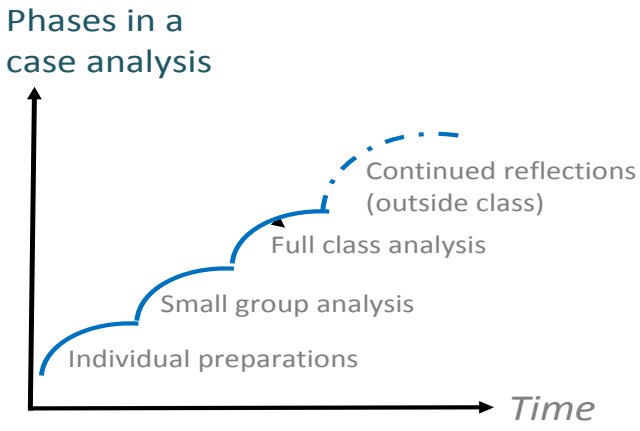

Figure 6: Learning phases in a case analysis process (Mark-Herbert, 1999, 11).

In a class where the case serves as a vehicle for learning, students submit an analytical note that is graded prior to group and full class discussion. Students may also be asked to complete a self-evaluation of the analytical process. A case does not have a given answer. Students and groups of students interpret the empirical situation in different ways – leading the way to a unique analysis every time a case is used. When students are asked to complete a self-evaluation of their individual analytical note, it may show how the analysis in the group has taken the analysis to a new level – and how the full class analysis adds more dimensions. The teacher may take a number of roles depending on how experienced the class is in using case studies (Mark-Herbert, 1999). On commencement, the teacher gives instructions and frequent feedback but towards the end of a course, when students have developed analytical skills and communicational comfort zones, the teacher is merely an observer of the learning process.

3.3 An interactive lecture on Innovation and Sustainability

This empirical illustration focus on an interactive lecture by the co-authors of this report Matthew Cook, who is a senior lecturer in the Innovation and Sustainability at the Open University in the UK. Matt is a returning lecturer in a course at masters level called Environmental and corporate social responsibility marketing at the Swedish University of Agricultural Science (SLU). The topic of his lecture is “Innovation and Sustainability”. This lecture was selected because of its creative and interactive style in which dialogue between the lecturer and students is emphasised. This lecture was observed by the co-authors Per-Anders Langendahl and Cecilia Mark-Herbert. Insights gained from these observations are illustrated below. Importantly, Matt has not lectured with the concept of gamification in mind. Observations sow that this is what typically goes on in his lecture.

Prior to the lecture, students are given the opportunity to prepare themselves by reading selected journal papers suggested by Matt. The reading list includes journal papers that present theories, concepts and ideas associated with innovation and sustainability. The reading list introduces the student to this field. Importantly, the innovation and sustainability field is thoroughly inter disciplinary (e.g. innovation studies, geography, science and technology studies) and there are multiple of understanding these complex processes.

Matt begins the lecture by introducing himself and the outline of the lecture. The outline includes the learning objectives of the lecture. He then approaches the topic of the lecture by asking an open-ended question to the students: “what is innovation?” The question is deliberately open-ended because there are many different theories, concepts and ideas about innovation and sustainability that offer very different answers. This initial question challenges the students. Rather than begin with telling the students about the theories and concepts of innovation, he then engages the students by asking them to tell him what they think innovation is.

Responding to this initial open-ended question is not easy and indeed, it is not meant to be. In contrast to a traditional teaching approach where there might be right or wrong answers, this question is open to interpretation. Therefore, Matt prompts the students to give an example of an innovation. A student waves her hand and suggests mobile phones as an example. The response from the student leads to further questions from the lecturer. Matt typically follows up a response with follow-up questions, e.g. “why is that an innovation?” or “what do you mean?” These follow-up questions often lead to further dialogue between the lecturer and the students.

The open-ended question is used at the beginning of the lecture to get students to generate their own questions and as such, an interest in the topic. The initial discussion introduces the idea of innovation in a simple way from which students can be introduced to established theories and concepts of innovation.

By introducing the topic with an open-ended question, Matt engages the students in an open-ended dialogue. The students are active in the classroom and they are constantly asked questions by the lecturer that require them to think and respond. The approach used by Matt to engage the students and open the lecture up to dialogue can be described with the following attributes: 1) peer-to-peer relationship, 2) student contribution, 3) friendly and fun atmosphere, and 4) challenging without rights or wrongs. These attributes are described below.

During the lecture Matt seeks a *peer-to-peer relationship* between him and the students as well as between the students themselves in the classroom. He does so by asking open-ended questions that create a dialogue and discussion between the lecturer and the students as well as between the students on selected topics. This approach creates a multi-way dialogue in which a question generates a response that in turn leads to further questions and responses, which sometimes leads to a debate between participants (i.e. Matt and students) in the class room. As such, Matt encourages the students to think and share their views on a particular topic. Often the lecturer has to intervene in such instances since there is generally insufficient time in a lecture to let discussions or debates reach their natural conclusions. Here the lecturer uses prompts (e.g. follow-up questions) to steer the discussion in a certain direction. Discussions and debates can also be closed by returning to the presentation outline.

Student contribution is a central feature of the lecture. Students may contribute to the lecture on a voluntary basis by responding to questions or sharing their thoughts and ideas on selected topics. Students that contribute are rewarded with terms such as “that is an excellent point you make”, “that sounds interesting, tell me more” or, “thank you for your contribution, you have done well!” However, some students may not feel comfortable and/ or familiar with the idea of making verbal contributions in a lecture. Therefore, Matt often engages students

that have not contributed by asking them directly what they think about a particular topic. He can also engage students through friendly prompts where this is appropriate, e.g. “guys in the back are sleeping with their eyes open”. In such instances, friendly prompts or jokes can lift the mood in the class room and work as an invitation to a student to say something.

The *atmosphere* in the class room is also a central feature in this lecture. By using fun or amusing statements, Matt is good at creating a friendly and fun atmosphere in the class room. For example during a discussion on economics and the idea of rational behaviour, Matt uses himself as a reference saying: “I did not fell out of bed this morning assessing the costs and benefits of my next sets of actions to maximise my net benefits. Rather, I followed a routine”. This simple story is not only fun (live), but it also creates an understanding of the concept rationale behaviour as well as introduces the idea that behaviour can be understood using the idea of routine, which is a different concept to rationale behaviour.

The lecture is also *challenging* to all participants, including the lecturer and the students. For Matt as a lecturer, it is challenging since he opens up the lecture to dialogue, discussion and debate, which can at times be difficult to control. Strategies for intervening in discussions are therefore needed so that the outline of the lecture and its learning outcomes (i.e. what students are expected to gain from the lecturer) are not compromised. Also and importantly, while Matt follows a structure or a story that runs through the lecturer, he cannot fully rely on a script. Since dialogues and discussions may open up unforeseen discussions he has to think and sometimes improvise, not by making things up, but to find an example or make links between the discussion and the body of knowledge.

For students, the lecture is *challenging* since it requires them to think and be on their ‘toes’. In other words, students cannot sit and relax in the lecture theatre, take notes and then leave. Rather, the lecturer seeks a multi-way dialogue and students are continuously encourage to contribute through the lecture. As such, it requires students to think and share their thoughts with their fellow students including the lecturer. The lecture is therefore challenging for both students and the lecturer. However, the friendly and fun atmosphere creates an inviting environment in which students become progressively more engaged as the lecture proceeds. Importantly, Matt makes it clear that there are *no right or wrong answers*. Indeed, research in the innovation and sustainability field has multiple disciplines that offer different ways of understanding. Matt tackles the complexity of this field by exploring innovation and sustainability together with the students through the lecture. As such, the lecture can be thought of as an exploratory journey for both him and the students.

Through this journey, Matt in the role as lecturer intervenes and steers the lecture through a pre-scripted story that creates both a structure of the lecture and a sense of progression that works towards learning objectives. Through this journey (i.e. the lecture), Matt uses repetition. After each break, students are typically asked “what did we do before the break?” This question offers an opportunity for the students to identify, repeat and further discuss the main learning points of the lecture.

After this lecture the class is given time to reflect as a part of the half time evaluation of the course. Typically students reflect on a multitude of dimensions with appreciation of what they have been part of. Yes, *part of* not exposed to. Students realize that they have contributed to the dialogue, part of a playful analytical process in which their contributions have been recognized and rewarded. They also reflect on their own capability to verbalize a contribution (Matt offers time to think in the dialogue and an openness to different perspectives). A good

number of students are boosted in their self-esteem, which leads to an increased interest in studying abroad (the vast majority of the students that are part of the double degree program with Cranfield University have been inspired by this very lecture!)

This section has presented three empirical illustrations of teaching situations in higher education. Analysis of these illustrations is provided below.

4 Analysis

This section analyses the selected teaching situations using concepts and insights presented in sections 2 and 3 of this report

4.1 Game elements identified in the Chaos Week

The approach to teaching and learning in the Chaos Week is creative, challenging and fun. A *challenging* task was given to students at the beginning of the course. This task was shaped around the story of Gotland2050, and participants were given roles: teachers played a board of directors and students played consultancy firms. By completing this initial task students were presented with ideas, concepts and theories of good project management practice. From this initial task, students also identified what they needed to learn in order to develop good project management skills. The latter was assessed at the end of the course in similar style to the initial challenge. From this empirical illustration of Chaos Week a number of game elements were identified and presented in Table 4.

Table 4: A presentation of the links between game elements identified in the gamification literature (left) and chaos week (right)

Game element	Course activity in the Chaos Week
Challenge	Students were given a challenging task on day one of this project management course to understand 1) the purpose of the course, 2) its learning objectives and 3) to identify what they need to know to achieve good project management skills.
Narrative/ Story-telling	This project management module used the story of Gotland2050 to engage students to develop a proposal to a 'real' challenge. This story helped the students to link their water management and engineering skills with project management to develop a water management plan.
Role play	Both the teacher(s) and the students were taking on certain roles in this taught module. The teacher together with colleagues formed a corporate board with various skills and expertise. The students formed groups that took the role as "consultancy firms". The consultancy firms (i.e. the students) presented their proposals to the Corporate board, i.e. the teacher(s).
Feedback and progression	Students are provided feedback both during and after the presentations on day 2 and 5. The feedback is both targeted to the individual group and instant, e.g. nodes and questions from the teacher(s). The students are also given written feedback. In this feedback, the students are evaluated against criteria of good project management practice. The feedback from day 2 is compared with the feedback in day 5, which also provide a sense of progression in terms of what the student(s) have learned by taking this course.
Point system, badges and leader board	At the end of the course, the best proposal is rewarded. All presentations are evaluated and scored against criteria of good project management practice. The "consultancy firm" with the highest score is rewarded with something with symbolic value.
Enjoyment	Overall, students, including participating lecturers and teachers participating in this course seems to have enjoyed it as far as the student evaluations can tell. This suggests that taking enjoyment into learning is of value to students.

This analysis identifies a number of links between the game elements found in the literature on gamification and learning activities in the chaos week. These elements include: challenge, narrative, role play, feedback and progression as well as point system, badges and leader

board. Such game elements were found to be useful in chaos week to engage and motivate students in learning activities.

4.2 Game elements identified in case based learning

A case study is a *story* that reflects a real-world situation. Similar to a video-game having an overarching story that grabs hold of a player, the case study story engages the student and motivates them to explore and analyse a complex "real world" problem. Thus, case study narratives become a vehicle for learning. The teacher's role is to prepare the story, instruct the students and support them (e.g. providing feedback) in their attempts to explore and analyse it. As such, the teacher's role shifts from instructor to participant in the process of analysing the case. For the students, they have to interact with the case study (Table 5).

Table 5: A presentation of the links between the game elements identified in the gamification literature (left) and the case study approach (right)

Game element identified from literature	**Case based learning**
Narrative/ Storytelling	A case study is a story that reflects a real-world situation. The story becomes the vehicle for learning
Progression and Trial and error;	Students explore and analyse the case study in a progressive process. They are presented with questions with increased difficulty, and use theory to develop insights. They work individually, in small groups and in class. As such students has the opportunity to test their argument in group- and class discussion as well as learn from each other. There are no given answers to the questions in the case.
Feedback	Both group- and class discussions offers opportunity for instant feedback from other students as well as the teacher
Role-play	Students can take on multiple roles when exploring, analysing and discussing a case study
Challenge	A case study creates a challenging task for the students. Sometimes the challenge is in analysing what is given in the case, sometimes it is identifying what additional information that would be needed to make an assessment and sometimes ethical aspects provide difficulties
Enjoyment	Student may enjoy the task of exploring and analysing a case study and to discuss the case

The students explore the case study first individually, then in a small group and finally in the class room where all the students including the teacher participates. This interaction with a case study can therefore be both challenging and fun. The case study becomes a device to activate the student and encourage them to explore and analyse a complex situation. The case study is also useful to enable a discussion and debate where students can test their arguments and receive feedback from other students including the teacher. Since a case study typically does not have a single answer, there is an element of *trial and error* prevalent when exploring the case. As such, the case study becomes the vehicle for learning and the students learn from engaging with the case study story.

4.3 Game elements identified in the interactive lecture on Innovation and sustainability

In the interactive lecture, Matt starts with an open-ended question that reflects the topic of the lecture. In this way, the lecture is opened up for dialogue and the students are encouraged to contribute in discussions and debate. Having to think and engage in discussions requires the students to be active and not passive through the lecture. This interactive nature of the lecture can be engaging and fun but also challenging for all participants (including Matt). The interaction between participants through discussion and debate also enables the lecturer to explore the topic together with the students and creates a peer-to-peer relationship between participants. This exploratory approach creates trial and error dynamics through the lecture where by the students can test their arguments and gain instant feedback from both other students and the lecturer. In this way, students are active in the classroom and rewarded with insights that they may not acquire from reading a book. Game elements identified in this teaching session are presented in Table 6.

Table 6: A presentation of the links between the game elements identified in the gamification literature (left) and the interactive lecture (right)

Game elements	Interactive lecture on innovation and sustainability
Challenges	The open-ended question in the beginning of the lecture challenges the students to think and respond
Narrative and Progression	The lecture is built around stories (e.g. theories and case study examples) that covers multiple disciplines. These stories are also presented in a progressive format, from dominant forms of understanding innovation and sustainability to novel theories, concepts and ideas.
Trial and error	The students are encouraged through the lecture to contribute to discussion and debate. The nature of the discussions are open-ended with no right or wrong answers. Therefore, students can test arguments on the participants in the class room
Feedback	The interaction between the student and lecturer as well as among the students offers instant feedback on contributions made by a student. In such instances, feedback tends to be of an encouraging nature. For a student having contributed to the lecture, feedback from other the lecturer, including other students can be rewarding.
Enjoyment	The student evaluations suggests that student enjoyed this lecture. The interactive nature of the lecture enables discussion and debate, which allows the students and the lecturer to explore the topic as peers.

A number of game elements were found in this lecture, notably challenge, freedom to fail, feedback and enjoyment. These elements can be linked to the interactive nature of this lecture involving discussion and debate between participants. Importantly, the lecture both engages and motivate students to be active and not passive learners.

5 Discussion and conclusions

This section summarises the finding of the analysis presented in section 4, discusses these in light of the pedagogical framework presented in section 1.3 and presents the conclusions of the report.

The analysis suggests that gamification is not alien to higher education. Rather, the empirical illustrations show that elements and dynamics associated with the gamification concept can be found in higher education. This insight resonates with the work by Stott and Neustaedter (2013): in that gamification already exists to some extent in modern pedagogical practices. Indeed, the empirical illustrations show that the approach taken in these successful teaching situations corresponds with some of the game elements found in the gamification literature. A summary of the game elements identified in the empirical illustrations is presented in Table 7.

Table 7: Summary of game elements identified in the analysis of the selected teaching activities

Game elements	Chaos Week	PBL Using Case Study	Classroom lecture
Surface elements	Point system, badges and leader board		
Underlying dynamics	Narrative, role play, feedback, progression	Narrative/ storytelling, Trial and error, instant feedback, role play	Trial and error; Instant feedback, narrative and progression
Participant experience	Challenges, competition, enjoyment	Challenges, enjoyment	Challenges, enjoyment

The summary of game elements identified in the selected teaching situations serves to illustrate that these are already used in higher education situations. Looking across the teaching situations, four game elements are deemed salient in higher education to engage and motivate students, namely: narrative, challenge, progression and feedback.

- Narrative is used in the selected teaching cases to engage students in learning. However, the use of narrative is very different between these teaching cases. In the Chaos Week, Gotland2050 serves as the underlying story that encourages students to apply their knowledge in water management and develop a project proposal. In other words, the narrative motivates students to engage with the learning activity. Similarly, the tiger shrimp case study is a narrative that encourages students to reflect on a complex problem and discuss possible solutions. In the lecture case, short stories are used that link theory and empirics, which may help the students to understand concepts and ideas about innovation and sustainable development.

- Challenge is used in the selected teaching situations to engage students from the outset by placing the focus of learning on them. For example, in the interactive lecture, Matt begins the lecture by asking the students open-ended questions on innovation, which challenges the students to think about the topic. Using challenging questions also engages students in discussion and debate. Importantly in this case, the challenge-element is used to encourage students to develop questions on their own that can be further explored during the lecture in collaboration with the other participants. As

such, the challenge-element may trigger questions among the students who learn by seeking answers to these questions.

- Progression is used in the selected teaching activities by which the students are faced with increased difficulty. For example, in the case based approach, students are given tasks with increased difficulty.

- Feedback is both frequent and targeted to individuals in the selected learning activities. For example, in the interactive lecture, feedback is frequently provided to students who engage in discussion and debate during the lecture.

Based on these insights we return to the pedagogic framework presented in section 1.3 and discuss the findings from analysis and their relevance to teaching and learning in Higher Education settings.

5.1 Gamification: its contribution to learning

Drawing on the analysis in section 4, which identifies a number of game elements in the selected teaching situations, we discuss their use and contribution to learning below.

In all three teaching situations, students are challenged from the outset. In chaos week, students are asked to present a solution to a board of directors; in PBL using case studies, students are presented with a story and given complex tasks to engage with; and in the interactive lecture, Matt asks students about the topic before presenting theories and concepts to them. Presenting students with a *challenge* from the outset places the focus of learning on students not the teacher. This links well to level 3 teaching, in which the focus is on 'what students do'. In putting the student and learning on the centre stage, an initial challenge can have motivational effects.

An initial challenge removes the students from their comfort zone. Rather than presenting students with what they need to know, they are asked to find the knowledge themselves with support from the teacher. The student has to engage with the challenge at hand, therefore, the challenge can help motivate students to learn. Students have to engage with the learning activity and be active throughout the activity to successfully achieve the learning objectives. In other words, creating a sense of challenge at an early stage of a learning activity may help to promote a deep approach to learning. In such instance, however, it is up to the student to stay engaged with the learning activity.

The use of *narrative* ia successfully deployed in the empirical illustrations. The story becomes the vehicle for learning. For example, chaos week usea the story about Gotland2050 coupled with role-play; the case study approach use the story about the tiger shrimp case; and in the interactive lecture, short stories (illustrative examples) are used that link theory with real-world situations. The use of stories can help to engage students in the learning activity and motivate them to learn. The story can also help to create a sense of enjoyment for students involved in a learning activity.

The use of *feedback* in the selected teaching situations shows how feedback can be both frequently used and targeted to individual students during a learning activity. In the chaos week, students are given feedback on their project presentations. Importantly, the initial feedback provided after the first presentation is coupled with the evaluation criteria for good

project management practice. The students are then offered a second chance whereby they can learn from their initial experience to understand the evaluation criteria and present again. In the case study approach, students are given an opportunity to receive frequent and targeted feedback from the teacher as well as other students when engaging in discussions about the case. And in the interactive lecture, students receive feedback as they engage in dialogue and discussions with the lecturer and other students.

A summary of game elements found in the selected teaching situations and their contribution to learning is depicted in Table 8.

Table 8: Gamification and learning contribution

Teaching situation	Gamified activities	Contribution to learning
Chaos Week	Students are presented with a challenge on day one; they subsequently learn the "rules of the game" in terms of evaluation criteria for good project management practice; students take on the challenge again	The challenge presented to students including the story engages the students to be active in the learning activity. The challenge both initiate and maintain students' motivation to learn. It also encourage students to gain both declarative and functional knowledge
Case study approach	Students are presented with a case study story, which is used through the learning activity as a vehicle for learning	The case study story engages the students and initiate motivation to learn. The progressive format involving interaction between the student and the teacher further engage the students. It also encourage students to gain both declarative and functional knowledge
Interactive lecture	Students are challenged with open-ended questions to explore with the lecturer and the other students. Feedback is frequently used through the lecture and targeted to individual students.	Students are engaged from the beginning of the lecture in dialogue and discussion with the lecturer and other students. The interactive nature is maintained through the lecture It also encourage students to gain both declarative and functional knowledge

Table 7 shows that gamification, and the use of game elements are deployed in higher education as a means to motivate and engage students, and as such, to contribute to learning. Gamification can be used in education to stimulate students' motivation and prompt them to engage properly when learning. As such, in creating a game like experience (e.g. presenting students with a challenging task and using a story as a vehicle for learning) this may encourage a deep approach to learning. Gamifying learning may also help students to stay active, rather than falling into a passive mode, through a learning activity. Importantly, the selected teaching situations shows that students are given the opportunity to acquire both declarative and functional knowledge.

Declarative knowledge (e.g. memorize, explain or theorize) is promoted by presenting students with relevant theoretical frames. For example, in the chaos week students are

presented with evaluation criteria for good project management practice and in the interactive lecture students are presented with theories and concepts of innovation. Students are also given the opportunity to gain functional knowledge in the selected teaching situations. Functional knowledge refers to, among other things, the ability to apply theory to a real situation or task. For example, in the chaos week, students use knowledge gained during the week to present a project proposal; in the case study approach, students apply their understanding about CSR on the tiger shrimp case.

5.2 Towards an pedagogy to engage and motivate students

The analysis of the empirical cases in this report illustrates how game elements are mobilized in higher education context with particular reference to marketing and sustainable development disciplines. The analysis shows how game elements work in practice as a means to improve learning in particular. However, the findings say little about how we might understand gamification as a pedagogy to engage and motivate students. To enable an understanding of how gamification might work in practice the following aspects of teaching and learning were identified and further explored; these are cognitive, performative and normative (see Table 9). Cognitive aspects involves notions of psychology and the idea of mental models. Performative aspects involve the process of seeing and doing. Normative aspects relates to reflective evaluations, e.g. identifying what is good and bad in a particular context.

Table 9: Analysis of cognitive, performative and normative aspects of gamification

Analytical categories	**Cognitive**	**Performative**	**Normative**
What they mean	Mental models: how students think about teaching and learning	Process of doing: what students (and teacher) do in a teaching session	Reflective notion: what students perceive as good and bad teaching
How they relate to empirical cases	Students may expect a passive role as audience in a teaching session. In contrast, the empirical cases show that game elements can be used to encourage students to be active in the learning activity.	Students are encouraged to be active in the teaching session, which in turn creates an interactive and dynamic learning process that takes place throughout.	Student evaluation shows that students appreciate the creative and interactive features of the teaching sessions, which are perceived as good teaching practice
How gamification work to engage and motivate students	Gamification can be used in teching sessions to surprise and disrupt students, which in turn may open up their mental models about teaching and learning	Gamification can be used to encourage students to be active in a teaching session	Students that enjoy teaching session may also stay motivated and engaged throughout.

Table 9 analyzes cognitive, performative and normative aspects of gamification as a means to understand how game elements work in practice. This framework shows that gamification can be used in teaching sessions to 1) surprise and disrupt students, which in turn may open up their mental models about learning and help students to think differently; 2) encourage

students to be active in teaching sessions, which in turn may trigger high level of engagement; and 3) to make learning fun. As such, cognitive, performative and normative aspects of gamification serves as a useful framework to analyse how gamification works in practice. This framework was developed from the analysis of gamification in higher education and is therefore an important contribution of this report

5.3 Conclusions

This report has explored gamification in higher education. Findings from the literature review on gamification in education suggests that: 1) the most common game elements used in teaching includes points and badges; and 2) gamification is typically deployed in computer science and IT disciplines. In contrast, Stott and Neustadter (2013) takes a different approach to gamification and identifies other game elements in education, e.g. narrative. This suggests that gamification is already recognized to some extent in teaching and learning. Following this view, this report identified game elements in creative and interactive teaching sessions within marketing and sustainable development disciplines.

To conclude, gamification can be deployed in higher education to motivate and engage students. Importantly, gamification does not require software applications and supportive technological infrastructure. Rather, this report identifies four game elements that can be used to enhance student engagement and motivation; these are narrative, challenges, progression and feedback. These elements can be deployed as means to encourage students to stay active during learning and promote deep approaches to learning. Here deep approaches to learning are pedagogic activities in which students gain both declarative and functional knowledge. Gamification can also make learning fun and enjoyable for students as well as for teachers.

As the successful teaching sessions in the empirical illustrations show, gamification is not as alien to modern pedagogical practice as one may expect. Rather, in some instances, gamification shares common ground with teaching and learning in higher education. Thus the purposeful use of gamification may enhance the learning process by creating interactive and fun teaching sessions; to motivate and engage students by placing the students and what they do at the center of learning activities; and encourage students to more actively engage with learning activities.

Gamification may not, however, help teachers and teaching institution to reduce their workload. Rather, gamification can be used as part of, or in addition to, existing teaching approaches. As such, gamification and associated elements can be viewed as an additional tool in the ‘pedagogical toolbox’ and be used in teaching to gamify certain learning activities. Therefore, it may not be an approach to make teaching more efficient (e.g. fewer teaching hours) but rather to make teaching more effective as it may contribute to students learning outcomes as well as their overall experience from the university.

While the findings from the empirical cases illustrate how gamification work in teaching practice, they says little about how to understand gamification such practices. An analytical framework was therefore developed to understand how gamification work in practice with reference to cognitive, performative and normative aspects (see Figure 7).

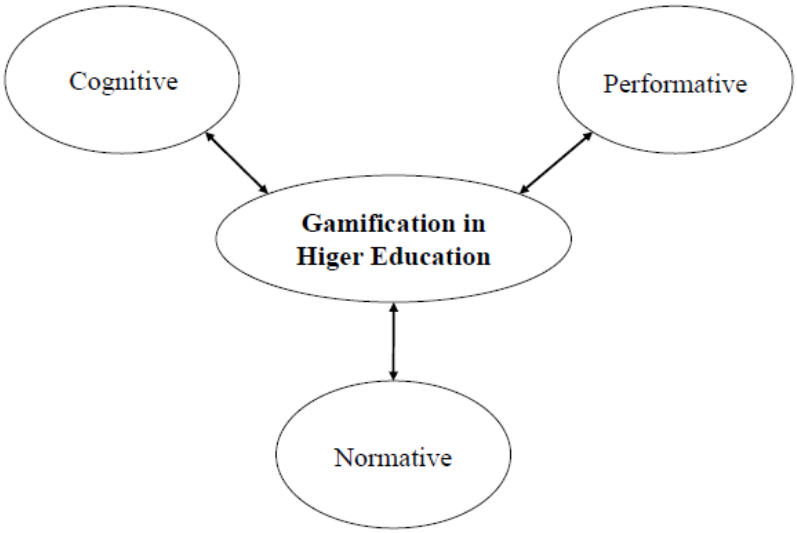

Figure 7: Analytical frame for understanding how gamification work in practice

Using game dynamics and elements in a non-game setting must be carefully assessed. The framework depicted in Figure 7 can be used to understand how gamification might work in practice. This framework emphasises different aspects of teaching and learning, namely cognitive, performative and normative. The framework also emphasises the process of teaching and learning and not necessarily outcomes of these proceses. Indeed, gamification should not be used in such a way that it may compromise students learning objectives and/or outcomes. Rather, the use of gamification in (higher) education must be consistent with learning goals and learning objectives and contribute to these.

5.4 Project contributions

This section returns to the Project Objectives (**PO**) articulated in section 1.1 and identifies project contributions.

- PO1: *Identification of the current understanding of gamification and its deployment in selected contexts, in this case education, with particular focus on marketing and sustainable development disciplines*

The literature review in section 2 presents a state of the art understanding of gamification in higher education. More specifically, gamification refers to the use of game elements in non-game contexts. Here game elements responds to characteristics of games, and context refers to the activity and setting gamified. As such, gamification is an open and multifaceted concept with multiple applications. The literature review identifies a number of game elements, which are categorised as 1) surface elements, 2) underlying dynamics and 3) participant experience. The categorisation of game elements is a key contribution of this project.

- PO2: *Selection of useful 'elements' of gamification that correspond to teaching and learning contexts*

PO2 relates to PO1 since the literature review identifies game elements and discusses their use in teaching and learning contexts.

- PO3: *Presenting learning situations in higher education where gamification elements are identified*.

Following the idea that gamification already exists to some extent in modern pedagogical practice, three teaching situations were explored and how learning activities in these correspond to game elements identified in the literature review. A number of game elements were found in the empirical illustrations described in section 3 and presented in the analysis in section 4. From this analysis, four game elements were deemed particularly useful: challenge, narrative, progression and feedback.

- PO4: *Explaining enabling factors for using gamification in (higher) education*

Gamification can be used in higher education to motivate and engage students. A number of factors were identified in this regard. First, gamification can be used as part of the mix of teaching approaches in higher education. For instance, game elements can be introduced in a course to enhance student experience and enjoyment when learning. Second, gamification can be used in education to promote an interactive learning process in which the focus is on the role of the student and what they do when learning. Third, how gamification may contribute to learning can usefully be understood in terms of cognitive, performative and normative aspects of teaching and learning. Fourth, the use of gamification in higher education may need support from the teaching institution and should not (only) be the decision of individual teacher.

References

Andersson, L., Krathwohl, D, Airasian, P, Cruikshank, K, Mayler, R, Pintrich, P., Raths, J & Wittrock, M. 2001. *A taxonomy for learning, teaching and assessing. A revision of Bloom's taxonomy of educational objectives.* Longman, New York.

Bandura, A., 1986. *Social foundation of thought and action: A social-cognitive theory.* Prentice Hall, Englewood Cliffs. NJ.

Bloom, B.S. (ed.), 1956. *Taxonomy of education objectives: Handbook 1,* Cognitive domain, Addison Wesley Longman, New York.

Biggs J. & Tang, C. 2011. *Teaching for Quality Learning at University* 4th edition. McGraw Hill, Open University Press, Berkshire, the UK.

Mott, B. W., Callaway, C. B., Zettlemoyer L. S., Lee, S. Y. & Lester, J. C. 1999. *Towards Narrative-Centred Learning Environments.* Proceedings of the 1999 AAAI Fall Symposium on Narrative Intelligence, AAAI Technical Report FS-99-01, p. 78-82

Caillois, R., 2001. *Man, play, and games.* University of Illinois Press, Urbana, Chicago.

Daniels, M., 2010, Business has to get into the game, *Marketing Week.* Accessed online 2016-01-07 available at: https://www.marketingweek.com/2010/09/23/businesses-need-to-get-in-the-game/

Dicheva, D., Dichev, C., Agre, G. & Angelova, G. 2014. Gamification in education: a systemic mapping study. *Educational Technology & Society*, 18(3), 75-88

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. 2011. From game design elements to gamefulness: Defining "gamification". In A. Lugmayr, H., Franssila, C. Safran, & I Hammouda (Eds.), *MindTrek 2011* (pp.9-15). Doi: 10.1145/2181037.2181040

Dewey, J. 1938. *Experience & Education*. New York, NY: Kappa Delta Pi. ISBN 0-684-83828-1.

Erenli, K. 2013. The Impact of Gamification: Recommending Education Scenarios. *iJET* vol. 8, pp. 15-21, in Special Issue 1: ICL2012.

Erskine, J, Leenders, M. & Maufette-Leenders, L. 20013. *Teaching with cases* (3rd ed.) Richard Ivey School of Business, University of Western Ontario, London, On. Canada.

Gee, James, P., 2008. *Learning and Games in The Ecology of Games: Connecting Yout, Games, and Learning.* Katie Salen (ed.). Cambridge, MA: Te MIT Press, 2008. 21-40.

Hamari, J., Koivisto, J. & Sarsa, H. 2014. *Does Gamification Work? – A Literature Review of Emperical Studies on Gamification.* 47th Hawaii International Conference on System Science.

Healey, M. 2005. "Linking Research and Teaching: Exploring Diciplinary Spaces and the Role of Inquitry-Based Learning" in R Barnett (ed.) *Reshaping the Univeristy: New*

Relationships Between Research, Scholarship and Teaching. Maidenheard, United Kingdom, Open University Press.

JISC (Joint Information Systems Committee). 2015. *Digital Media online: on Gamification.* available at: http://www.jiscdigitalmedia.ac.uk/infokit/Gamification/elements (accessed 15 December 2015).

Kapp, K. M. 2012. Games, Gamifiation, and the Quest for Learner Engagement. Talent Development, 66(6), 64-68.

Koster, R, 2004. *A theory of fun for game design.* Paraglyph Press, New York, NY.

Langer, R., Hancock, M., West, A. H. & Randall, N. 2013. Applications as Stories, in ACM SIGCHI conference on Human Factors in Computing Systems, April 27 – May 2, Paris, France, conference website available at: https://chi2013.acm.org/

Lee, S. 2012. *The multiplayer classroom: designing coursework as a game.* Boston, MA: Cengage Learning.

Lee, J. & Hammer R., J. 2011. Gamification in Education: What, How, Why Bother? *Academic Exchange Quarterly*, 15(2).

Mark-Herbert, C. 1999. *"Case metodik"* en pedagogisk skrift, SLU Pedagogiska rapporter (nr. 45) available at http://www.ucl.slu.se/documents/Rapport45.pdf

Miles, MB. & Huberman, AM. 1994. *Qualitative Data Analysis* (2nd edition). Thousand Oaks, CA: Sage Publications.

Mont, O., Lehner, M. & Heiskanen, E. 2014. *Nudging. A tool for sustainable behaviour?* Report 6643. Naturvårdsverket, Stockholm.

Pirker, J., Riffnaller-Schiefer, M., & Gütl, C. 2014. *Motivational active learning: engaging university students in computer science education*. In Proceedings of the 2014 conference on Innovation & technology in computer science education (ITiCSE '14). ACM, New York, NY, USA, 297-302. DOI=10.1145/2591708.2591750 http://doi.acm.org/10.1145/2591708.2591750

Reeves, B. & Read, J.L., 2009. *Total Engagement: Using Games and Virtual Worlds to Change the Way People Work and Businesses Compete.* Harvard Business School Press, Boston, MA, USA, ISBN: 978-1-4221-4657-6

Robertson, M. 2011. *Can't play, won't play*, available from: http://hideandseek.net/2010/10/06/cant-play-wont-play/ (Accessed 2 March 2016)

Rotter, J. & Mark-Herbert, C. 2013 Corporate Social Responsibility in Swedish Food Retail: The Case of Tiger Shrimp Official Case of the IFAMA 2013 International Student Case Competition OPEN SOURCE – available Volume 16, Issue 3, 167-176, 2013, ISSN #: 1559-2448, available at: http://ageconsearch.umn.edu/bitstream/156467/2/20130031_casea.pdf

Stott, A. & Neustaedter, C. 2013."*Analysis of gamification in education*" Surrey, BC, Canada

Thefuntheory.com. 2009. Headging is missing… Available at http://www.thefuntheory.com/ (Accessed online 29 February 2016)

Watkins, C. & Mortimor, P. 1999. Pedagogy: what do we know? In Mortimore (ed). 2001. *Understanding Pedagogy and its impact on learning*. Sage Publications.

Werbach, K. & Hunter, D. 2012. *For the Win: How game thinking can revolutionise your business*. Wharton Digital Press, University of Pennsylvania

Appendix A. The tiger shrimp case

Corporate Social Responsibility in Swedish Food Retail: The Case of Tiger Shrimp (Rotter & Mark-Herbert, 2013)

Linda, 42 years old, is the Head of Corporate Social Responsibility (CSR) at Axfood, the second largest food retail in Sweden (Appendix 1). Linda's main task at Axfood is to communicate and enable dialogue with stakeholders, internally and externally, regarding sustainability issues as well as advise on corporate strategies. She is one of the seven members of the board of directors besides the Chief Executive Officer (CEO) and Chief Financial Officer (CFO) and a number of experts for example within the field of the retail industry, corporate governance, compensation and financial analysis. She is passionate about driving ethical issues and describes herself as an activist. In Sweden, the notion of corporations being responsible and accountable for social and environmental issues is not particularly new, but the interest as well as explicit communication has been growing greatly over the last decade. Therefore, Axfood has developed an overall Code of Conduct (**CoC**), which states that it is important taking into consideration the implications of environmental and social issues related to their products and corporate conduct. Yet, in practice, such ambitions are challenging to implement, especially if there is a direct trade-off between profits and ethical conduct.

As a food retailer, Axfood is in direct contact with consumers and if also has the power to influence supply chains on what and how food items are produced. Food retailers further can choose what to stock and how to educate consumers in stores about life style food related choices, including health and environmental aspects or locally-produced products. Yet, food retailers have to attract consumers beyond their product range, given that the industry itself is highly competitive. This is where branding, communication and differentiation strategies become very important, and not just within the realm of agribusiness.

Most recently Linda was involved in social media activities, which among other purposes will be used as a new way of managing stakeholder relationships. Social media is believed to carry a strong political power, empowering consumers as well as 'democratizing' Internet content. From a corporate perspective it is even declared as one of the most important mechanisms for accountability of the 21st century. This development is mainly driven by globalization in combination with technological advancements (smart phones, Internet, etc.), which has led to a revolution in how information is created, shared and communicated. Social media can increase transparency and credibility, through enabling an instant dialogue with a wide range of internal and external stakeholders. Therefore, a social media presence could also act as a risk or crises management strategy, as stakeholders have the chance to 'voice' their opinion, which is crucial in fostering 'loyalty' and preventing 'exit'.

During the early phase of investigating social media applications such as Facebook, Twitter and Youtube as a communication channel for Axfood, Linda has come across a large number of comments regarding 'tiger shrimp' on diverse blogs and Internet forums. It seemed tiger shrimp received a lot of traditional and social media attention, locally and internationally, which is mainly driven by diverse range of consumer interest and activist groups. For example, one video pronounced the tiger shrimp cultivation even as 'one of the worlds most environmental hazards' (http://www.youtube.com/watch?v=kw0tkYK7oEM). Tiger shrimp, also referred to as tropical shrimp (*Caridea),* belong to the family of prawns. Interestingly, according the Linnean (1735) taxonomy, prawns are classified as 'insecta'. So technically crustacean, such as prawns, are not fish, and yet treated as such within the fish category of a food retailer like Axfood.

Given increased consideration and debate around this product in Sweden, tiger shrimp has become an issue of Axfood's management board and Linda is asked to investigate and present a decision on how to handle this case. Even though, sustainability issues in aquaculture production are of general

concern, the case of tiger shrimp set off the demand to create a policy regarding sourcing and marketing of fish and seafood within Axfood. During her investigation, Linda learned that their two main competitors, ICA and KF-Coop, had recently implemented a Fish Policy, which stated their approach to the offering of fish and shellfish. For example, ICA decided to remove tiger shrimp from their centrally controlled wholesale product range. Linda knows that this does not prevent the individual and privately-run ICA stores to continue selling tiger shrimp. KF-Coop initially declared on their website that they will continue to sell only organic tiger shrimp certified by Naturland.

In order to get a more holistic view on the issue, Linda decided to contact certain consumer groups, suppliers, public institutions and other stakeholders that have an interest in this issue. Therefore, she has been in dialogue with different individuals and communities, and collected a number of statements and opinions regarding tiger shrimp. She has the following information on her desk:

- The World Wide Fund for Nature (WWF) is a large and well-respected global environmental organization. WWF operates on a global level with local branches, providing expertise on primarily environmental questions. In the case of aquaculture production, WWF communicates their knowledge through a color scheme, categorizing each fish and seafood product with a green, yellow or red color, which indicates the level of sustainability of various fish species, whether they come from a threatened population or a concern for production methods. In this way, WWF offers a hands-on guide on how to consume more ethically. WWF Sweden classifies both farmed and wild caught tiger shrimp as 'red listed', which suggests that consumption should be avoided. Tiger shrimp are not endangered, but the production and trade causes a controversial situation in terms of social and environmental implications for the developing countries, which are the main suppliers of tiger shrimp. Tiger shrimp production is mostly located in developing countries in Southeast Asia (80 percent) and South America (20 percent).
- According to the WWF, labeling of tiger shrimp is currently problematic as the information on how the shrimp are produced is inadequate. Therefore, the WWF is engaged in collaborations with other Non-Governmental Organizations (NGOs), governments, scientists and fishers with the aim to make tiger shrimp fishing, production and consumption more sustainable. This initiative is referred to as the Aquaculture Shrimp Dialogue (ASD). The WWF in collaboration with Aquaculture Stewardship Council (ASC) and other stakeholders are currently in the final stages of the ASD, which aims to create standards that minimize social and environmental impacts of aquaculture processes at the farm level.
- According to environmental activist organizations the social and environmental effects of commercial aquaculture have a significant impact on the quality of human life and often leads to increased poverty in the communities where tiger shrimp are cultivated. On the environmental side, issues include the decline of biodiversity and water quality, degradation of mangroves (salt-water tolerant trees) and pollution. Furthermore, a popular method for shrimp fishing is 'trawling', which is considered to be one of the most damaging and unsustainable fishing methods, given the disproportional amount of bycatch (turtles, sea horses, sharks, etc.). Social aspects encompass the loss of livelihoods in the producing regions and the potential rise of rural unemployment due to changes towards intensive farming methods. Yet, at the same time according to the WWF, tiger shrimp generate income and livelihoods for about 900 000 fishers globally. From a macro-economic perspective, tiger shrimp can be seen as an important commodity for export-led growth in the producing countries. In that way, it helps export-oriented countries, such as in Southeast Asia, to earn Foreign Exchange (FX). FX is crucial to trade with other countries, for example importing commodities that are produced cheaper somewhere else. Therefore, tiger shrimp production can be seen as an important source of comparative advantage for the developing countries. Furthermore, even though sustainability issues in commercial aquaculture production are of concern, there are many positive benefits associated with it such

as lower production costs and higher reliability of production, thus allowing for increased fish consumption, which reduces the pressure to overfish.

- One social matter is the involvement of child labor in agribusiness in developing countries. According to the International Labour Organization (ILO) officially about 21.6 million children are involved in child labor in South Asia. The United States Department of Labor reports that Thailand for example, being a significant producer of tiger shrimp, is considered having the worst child labor conditions including physical abuse, heavy workloads and lack of safety equipment with a salary level below minimum wages.
- The Swedish Food & Drinks Retailers Association's (Svensk Dagligvaruhandel) role is to develop principles and professional guidelines for Swedish food retailers. Their main objective is to ensure consumers' interests. All three major retailers in Sweden are currently members of this organization and are of the understanding that the entire fish category is being treated as a competitive matter when it comes to marketing activities of fish and seafood.
- Naturskyddsföreningen also known as The Swedish Society for Nature Conservation (SSNC) is a non-profit environmental organization that works to preserve natural assets, both in Sweden and globally. The SSNC is strictly against the sale of tiger shrimp and created an anti-(tiger) shrimp day (16th March) to mobilize consumers to protest against the trade of tiger shrimp irrespective whether sourced organically or not. The SSNC uses social media such as Facebook to organize and inform individuals (https://www.facebook.com/KeepEmOffYourPlate). The SSNC suggests replacing tiger shrimp for example with crayfish, crabs, oysters, mussels or lobster.
- KRAV and Naturland are two organic certifying organizations and accredited members of International Federation of Organic Agriculture Movements (IFOAM). Yet, their views on the tiger shrimp diverge. Naturland, a German-based association for organic agriculture, certifies organic tiger shrimp for markets in various European countries. Naturland certifies the organic product itself, which also includes social and environmental requirements associated with the production process. KRAV, 'a key player in the organic market in Sweden since 1985' does not offer certification for tiger shrimp due to social issues associated with the production processes. This position is strongly influenced by the Swedish Society for Nature Conservation (SSNC). Naturland's products were sold on the Swedish market through Pandalus, yet they are to be discontinued due to lobbying efforts of the SSNC and KRAV.
- Pandalus, a wholesaler in the fish and shellfish industry, works exclusively on retail and wholesale trade where sales are made at the central level. KRAV does not approve the organic certification of Naturland, which is the only accepted certification for organic aquaculture products sold in Sweden. Pandalus is waiting for the outcome of the current situation of the Aquaculture Shrimp Dialogue (ASD), while simultaneously working to supply traceable shrimp that meet the criteria that the dialogue might result in.
- Stockholm Consumer Cooperative Society (KfS, Konsumenföreningen Stockholm) is a consumer cooperative membership organization, which does not operate in the retail business, but is a partner of KF-Coop. The cooperation supports KF-Coop's ambition in trying to sell better products, rather than totally removing the product from their stores.
- GlobalGap (previously EurepGAP) is concerned with Good Agricultural Practices (GAP) for retailers and suppliers internationally in order to harmonize different agricultural standards as part of self-regulation. Standards are enforced through the control of internationally recognized independent inspection. The associated Swedish certification body is SMAK AB, which provides auditing for a list of certification schemes including KRAV. The standard aims to improve food safety, production conditions and environmental concerns. Through their logo the certification is theoretically easy to communicate to consumers, even though it is a widely used logo the level of awareness is

unknown. GlobalGap offers a general aquaculture standard and certification, which is not particularly developed for the tiger shrimp issue.

At first seemed like a binary decision; Linda needed to decide whether Axfood should continue selling tiger shrimp or not. Yet, she realized that taking the decision would be much more complex and had potentially political and economic implications especially for Axfood but also other stakeholders. She was aware that some consumers still demanded the product and that one of Axfood's tasks was to fulfill such consumer wants.

One factor to consider in making the decision was a precedent Axfood has set earlier in respect to a popular one-way BBQ grills (Engångsgrill). Most of Swedish sold one-way BBQ grills are produced in China, where Axfood started to control production methods for health and safety standards and child-labor free production. Yet, implementation and enforcement was very challenging and resource intensive, yet it was considered advantageous since the product could not be easily substituted and there was no other collective solution planned to address this problem. In this way, Axfood could continue selling one-way BBQs with added value while satisfying Swedish consumer needs and wants. But could that be a reasonable and manageable solution for the tiger shrimp case? Perhaps yes, but what about the other products in the fish category? Is it Axfood's responsibility to find special solutions for each product and its entire supply chain? Where are the boundaries? What is the (new) role of business in society? And how would Axfood communicate their decision?
Linda decided to approach Henrik, 33 years old, the assigned category manager at Axfood. As a category manager, he is responsible for not only the assortment but also the profit maximization of a product category. His decisions are relevant for all shops and store formats on a national level. It is a competitive job, as he earns a sales commission at the end of the year based on the profits made. He currently works with the fish category, which consists of frozen and fresh fish and shellfish. Henrik was aware that the tiger shrimp had caused some media attention lately yet he did not know the details. He considers himself a reasonably conscious consumer who is interested in the production processes of consumable goods, specifically food products. Yet, when it comes to his job, he knows that the overall goal of the organization is to be profitable and his salary depends on it. Tiger shrimp are one of the service products that generate a relatively high marginal profit. Over the last years, Henrik noticed an increasing popularity in tiger shrimp, as a food item, among restaurants and private consumers. He explained this by referencing the use of tiger shrimp as a very popular ingredient for many television-based cooking shows aimed at inspiring a bit of luxury in the everyday life of their viewers. Tiger shrimp are suitable as they offer a fresh and nutritious, easy-to-cook meal that even looks festive. Therefore, given constant consumer demand for the product, Henrik currently stocks the product in all stores. In preparation for the meeting, he summarized some key data for Linda (Appendix 2).

During the meeting Henrik told Linda about a dinner party that he recently attended, where serving tiger shrimp provoked a heated discussion among the dinner guests about whether one should consume or boycott tiger shrimp. A couple of the dinner guests, Per and Peppi, working for different international non-governmental organizations (NGO) with branches in Sweden, were outraged about the production practices of tiger shrimp and put pressure on Henrik to encourage Axfood to stop selling the product. Per, who works for Greenpeace in a local branch in Stockholm, stressed the irreparable environmental degradation caused by the type and increased production of tiger shrimp. Even though there have been initiatives to address the problem, as of today, there is no reliable labeling system or universal standard that allows for transparency of information regarding the production methods of farmed and wild-caught tiger shrimp. This makes it difficult for food retailers to know where the product comes from and under which conditions it was produced.

Peppi, whom works for Amnesty International in Gothenburg, was irritated by the fact that the working conditions in the producing countries, including the use of child labor, are accepted yet often unthinkable from a Western perspective. These issues are common in countries with weak political

and legal systems. Peppi emphasized that, according to the United Nations Guiding Principles for Business and Human Rights, even though the role of the state is to *protect* human rights, businesses have the role and responsibility of *respecting* human rights. Peppi believes it is unfair and unethical for Western societies to proudly consume products, such as in the case of tiger shrimp or the well-known case of diamonds from Africa, which are traded as luxury products yet are associated with 'bloody' production methods. If it were her decision, she would stop any kind of trade of products that are related to human rights abuses. Peppi considers this decision to be mainly in the hands of Multinational Corporations (MNCs) as they have the privileged position under global capitalism to be change agents and should have a moral obligation to social justice.

This was the moment when Mathias, the host, intervened and tried to reconcile opinions about the choice of dinner menu. Mathias admitted that he might not be totally aware of the environmental and social implications of tiger shrimps, yet believed that it was an overstatement, as a boycott would not improve or solve local conditions. He emphasized that food production especially linked to global supply chains by default causes extensive environmental and social issues and that it would need a holistic change on a global level. If we started to look at each single product, soon we would run out of options on what to consume and how to feed the world in the future. Therefore, until a holistic solution was found by critically evaluating and improving the way we produce and consumer food, it should be up to the individual to make the choice to consume or not consume products such as tiger shrimp and there should be no discrimination for either side. Mathias's wife Emma for example loves sushi and especially tiger shrimp. Her being a 'pescetarian', a person who does not eat meat but fish, she relies on protein and dietary minerals from fish that is low in fat.

Henrik mentioned to Linda that after the dinner he got intrigued by the complexity of the issue and conducted some private research regarding the debate over tiger shrimp. He read articles and watched videos that showed terrible working conditions for the locals, as well as the environmental degradation and pollution caused by the production. He concluded that information was rather one-sided, as it was much easier to find negative publications than ones showing potential benefits and opportunities. Still, personally, the situation was clear to him; he would try to find a substitute for his diet. Yet, in relation to his job, he was unsure as to how to proceed. As a large supermarket chain, he believed that they have a responsibility towards society and other stakeholders, besides investors. Henrik realized the difficulty in reconciling roles we act upon in everyday life, such as the one of the consumer and the professional one.

Like Henrik, Linda believes that Axfood has a larger responsibility towards educating consumers and perhaps the legitimacy of making the hard decisions regarding which products should be made available or not. Linda is asked to present her decision on the case of tiger shrimp to the board of directors on how to manage the tiger shrimp issue, as well as similar issues in the future. She is considering different options, such as boycotting the product, doing nothing and continuing the sale of tiger shrimp or perhaps forming a partnership with an NGO. She also contemplates about how social media, as a new communication tool, could be helpful in the process of making and communicating the decision.

Student instructions

Put yourself in Linda's position, who has the responsibility to represent sustainability issues within and outside of Axfood while trying to cater to different needs and expectations of stakeholders.

1. Who are the stakeholders that Linda needs to include in her analysis? How could she argue for prioritizing the needs of one versus the others?

2. Should Axfood keep selling tiger shrimp or not? What are your arguments for and against keeping the tiger shrimp in stock?

3. What recommendation would Linda present to the Axfood Board of Directors? Please consider and include the short and long-term consequences of your recommendation to the Board, as well as which actions need to be taken to implement such a recommendation?

Annex 1: A corporate background

Three large retailers dominate the Swedish food retail market, namely ICA, Axfood and KF-Coop. ICA owns the majority of the total market with 45.9 percent, followed by Axfood with 19.3 percent and KF-Coop with 18.5 percent. Smaller retail chains, such as Bergendahls, including Vi-stores, account for 5.3 percent of the total market share, while Lidl holds 3.2 percent, Netto 2.1 percent and others 5.7 percent. Figure 1 shows the relative market shares of all Swedish food retailers.

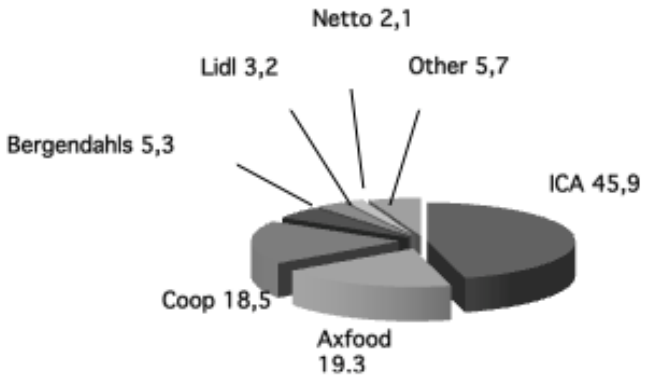

Figure 1 Market shares of Swedish food retail (2007).

Axfood, being Sweden's second largest food retailer by market share, has a corporate identity that is closely tied to that of overall sustainable development. Axfood has different store formats and operates under chains such as Hemköp, Willys and PrisXtra. In 2007, Axfood owned 217 shops and five distribution centers. Axfood's workforce in 2007 was 6 436 employees. This is a contrast to Axfood's main competitor, ICA, which is based on a combination of private owned shops and franchises, which therefore affords individual shops more autonomy. ICA Sweden in 2007 owned 1 382 shops and employed 5 107 people. KF-Coop is a consumer-owned cooperative, and therefore, often referred to as an NGO.

For more information, please visit their websites:

- ICA (http://corporate.ica.se/en/home/),
- Axfood (http://www.axfood.se/en/).
- KF-Coop (http://www.coop.se/Globala-sidor/In-english/).

Annex 2: Tiger Shrimp

Due to the constant rise in demand for tiger shrimp, especially from Western societies, production has drastically increased over the last three decades in order to meet this demand. Figure 2 shows the total tiger shrimp import in Sweden between 1997 and 2007.

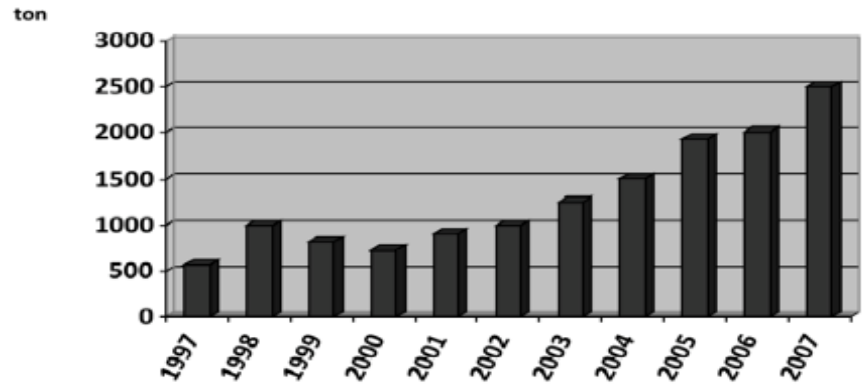

Figure 2 Total import of tiger shrimp in Sweden between 1997-2007.

In 2007, Axfood's share of total tiger shrimp sales in Sweden was 13.25 percent, which amounts to approximately 18.883 tons of tiger shrimp (Figure 3). The retail price was on average 278 SEK/kg*, with a profit margin of 65 percent. Figure 3 present the total value of tiger shrimp sale in tkr (SEK) of the main food retailers in Sweden. Axfood's total revenue in 2007 was 29 189 MKr (SEK). In comparison, ICA Sweden's total revenue was 51 438 Mkr (SEK).

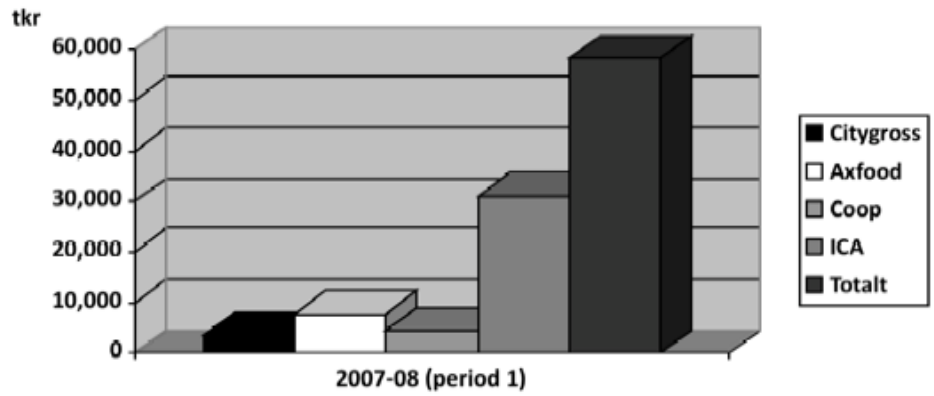

Figure 3 Total sale of tiger shrimp of main Swedish food retailers.

One reason for the increasing consumer demand may be explained by the favorable nutritional value for a balanced diet of fish in general, as well as being a popular, festive food item in particular. For example, Table 1 presents the average nutritional value for 100g of raw tiger shrimp, crayfish, tuna and salmon.

Table 1 Nutritional facts of selected fish and shellfishº (http://nutritiondata.self.com/).

	Crustaceans		Fish	
Product	Tiger Shrimp	Crayfish	Tuna (bluefin)	Salmon
Calories	106	72	144	208
Fat	2g (3%)	1g (1%)	5g (8%)	13g (21%)
Saturated	0g	0g	1g (6%)	3g (15%)
Cholesterol	152mg (51%)	107mg (36%)	38mg (13%)	55mg (18%)
Protein	20g	15g	23g	20g
Sodium	148mg (6%)	62mg (3%)	39mg (2%)	59mg (2%)
Carbohydrates	1g (0%)	0	0g (0%)	0g (0%)
Vitamin C	3%	1%	0%	6%
Vitamin A	4%	1%	44%	1%
Iron	13%	3%	6%	2%
Calcium	5%	2%	1%	1%
Price/ kg*	278 SEK	90 SEK	220 SEK	180 SEK

º percent daily values based on a 2,000 calorie diet.
* 7 SEK equals 1 US$

All four fish and shellfish products in Table 1 are low in sodium and considered a good source of protein, niacin, selenium, phosphorus, vitamin B6 and B12. Tiger shrimp being in addition a good source of copper, iron, vitamin D and selenium are however very high in cholesterol. Cray fish is also relatively high in cholesterol but offers a source of folate, magnesium, copper and potassium.

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