

## Research Article

# The Extended Likeability Framework: A Theoretical Framework for and a Practical Case of Designing Likeable Media Applications for Preschoolers

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A theoretical framework and practical case for designing likeable interactive media applications for preschoolers in the home environment are introduced. First, we elaborate on the theoretical framework. We introduce the uses and gratifications paradigm (U&G). We argue that U&G is a good approach to researching likeability of media applications. Next, we complete the U&G framework with expectancy-value (EV) theory. EV theory helps us move from theoretical insights to concrete design guidelines. Together, the U&G framework and the EV model form the foundation of our extended likeability framework for the design and evaluation of interactive media applications, for preschoolers in the home environment. Finally, we demonstrate a practical case of our extended likeability framework via the research project CuTI. The CuTI project aims at revealing those particular user gratifications and design attributes that are important to support playful behaviour and fun activities of preschoolers in the home environment.

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## 1. Introduction

Digital media are increasingly moving into everyday life. As a consequence, designers no longer exclusively focus on applications with productivity goals in a work-related context. Instead, the focus has also shifted towards design for entertainment, aiming at delivering a more social or emotional experience. Human-computer interaction (HCI) research has responded to this new trend and moved from the “second wave” to the “third wave” of HCI methods and theories. The first wave adapted methods and theories from cognitive psychology whereas the second wave was influenced by sociological principles and “situated” research methods. More particularly, second wave research still focused on technologies in a work-related context with explicit rational (i.e., instrumental) purposes. In contrast, third wave research is centred on emotional and cultural technologies in a more entertaining and everyday context [1]. Often, the third wave is equated with “user experience”

research or the “new usability” of affective factors such as “fun” and “trust” [2]. The recent shift within HCI from second to third wave research made the need for new or adapted research methods and theories more explicit, resulting in a move to ground human-centred research on user experience. Stelmaszewska et al. [3] also cite: “HCI lacks theories and methods to facilitate approaches to design products which allow for pleasurable, enjoyable, and entertaining Interaction.”

In [4], we came to the same conclusion, namely, that HCI and child-computer interaction (CCI) lack a solid framework for likeability research with preschoolers. The need for theories to gain insight into the meanings that children give to new media has been acknowledged within HCI and CCI. For instance, Learning and Teaching Scotland [5, page 8] points out: “There is no detailed analysis of how children make meanings with interactive media and a conspicuous lack of evidence about what actually happens in social, cognitive, and affective domains.” Hassenzahl [6]



FIGURE 1: A simplified model of the uses and gratifications paradigm, by Lucas and Sherry [12] based on Rosengren’s outline [10].

stresses that there is still a lack of successful methods to reveal experience-oriented product requirements: “...there are no specialized analysis techniques used in the industry. Therefore, it is important to develop appropriate analytical techniques to help product designers or usability engineers to gather hedonic requirements in a certain context of use.”

In Section 2 of this article, we detail our theoretical foundations. We first elaborate on the uses and gratifications paradigm, well known in mass communications science, and promising for researching fun and likeability of media. Next, we introduce expectancy value theory, originating from social psychology. The EV theory helps us move from user gratifications to product attributes. The combination of the U&G framework and the EV model forms the blueprint for our extended likeability framework for the evaluation and design of interactive media applications.

In Section 3 of the article, we apply our extended likeability framework to fun media applications, for preschoolers in the home environment. Via the CuTI research project we demonstrate how high-level user gratifications can be translated into product attributes.

## 2. The Extended Likeability Framework

### 2.1. Uses and Gratifications, a Communication Science Perspective

#### 2.1.1. The Uses and Gratifications Paradigm Outlined

The lack of available frameworks, theories, and models in HCI on likeability research for children explains why we turned our attention to communication sciences in order to find an appropriate framework that is “human-” centered. The uses and gratifications (U&G) paradigm, well known in mass communication science, is such a human-centered framework. The uses and gratifications paradigm accepts that users actively seek media, according to their needs and expectations, and give meaning to these media. The basic premise of the U&G paradigm is that people actively choose media to fulfil specific gratifications. U&G research is interested in what uses and gratifications the audience derives from media and what appeal media have for the audience. More particularly, the uses and gratifications (U&G) paradigm focuses on *how frequently* and especially *why* certain *types of (genres within)* media are used and *by whom* [7–9]. Rosengren [10, 11] presented a U&G model in which basic needs, individual differences, and contextual societal factors interact and result in a variety of gratifications that are sought from the media. People then use media in

the hope that the gratifications they seek can actually be obtained.

Figure 1 shows a simplified model of the U&G paradigm, presented by Lucas and Sherry [12] and based on Rosengren [10]. The U&G model does not specify how exactly the mix of societal factors, individual characteristics, and basic needs leads to certain types of media behaviour; rather, it calls on researchers to fill in these details. However, it does acknowledge that no single factor drives media use; it is only the mix and the interaction among needs, contextual factors, and individual characteristics that can predict media use.

For our research, we find this all-encompassing view interesting because it is similar to the multiparadigmatic view in human-computer interaction. HCI researchers also stress the interplay between social/contextual, individual/psychological, and tool/media characteristics. Nevertheless, models or theories that are employed to research enjoyment or fun are often narrowed down to physio/psychological parameters [13, 14]. In contrast, the U&G framework allows for a global approach that does not only incorporate basic biological influences and psychological dispositions but also addresses the social context. The influence and importance of context for product experiences can be found with different HCI researchers and theorists. Goffman [15], for example, refers to “situated experience”; Overbeeke et al. [16], Hummels et al. [17], and Dourish [18] emphasize the importance of “context for experience”; Hassenzahl [6] mentions “context of use.”

#### 2.1.2. Three Assumptions for Adopting the U&G Framework

In order to be able to use the U&G framework as a foundation for our likeability framework, we need to accept the following assumptions [4].

##### (1) Assumption 1: Interactive Artefacts Can Be Seen as Media

The choice for the U&G framework implies that we abandon paradigms that are current in work on human computer interaction, such as the “tool perspective” or the “usability perspective.” These perspectives are attuned to an adaptation of information and communication technologies to users’ cognitive competences. Such adaptations result in a more efficient and effective performance of predefined tasks. Technologies are also often conceptualized as “tools” within the HCI community. These “tools” then function as an extension

of the human body and/or mind, compensating for human shortcomings [20]. However, we no longer view artefacts as “tools,” neither do we follow the “usability perspective”; instead we look upon applications as “media” [20]. The adaptation of the U&G framework in likeability research demands acceptance of the view that artefacts like interactive toys and games can be considered as media. The “media perspective” in HCI resembles the way communication sciences define the concept “media.” Media are then defined as bridges that make communication and information possible between people [20]. This leads us to the first assumption: the U&G framework requires us to *accept that interactive toys, games, and other artefacts that support play activities can be thought of as media.*

### (2) Assumption 2: Children are Active in Their Choice of Media

U&G starts from the premise that the audience is active; an important part of mass media use is assumed to be goal directed [7]. Instead of being passive bystanders, people choose to engage in a medium and their choice reflects their need for gratifications. Thus, need gratification and media choice lie within the audience member. The perspective of an active audience is illustrated by Schramm et al. [21, page 169] who state that “in order to understand television’s impact and effect on children, we have first to get away from the unrealistic concept of what television does to children and substitute the concept of what children do with television.”

Clearly, this idea, that one actively chooses to deal with a certain medium based on particular needs and the need for gratifications, is very similar to the user-centred approaches that prevail in HCI. For instance, we can refer to the goal-directed design approach of Cooper and Reimann [22], where design requirements are based on needs in order to fulfil goals, wishes, and dreams. Similarly to communication scholars that follow a U&G perspective, we *posit that children are active in their choice to use or not to use media/applications for certain reasons.*

### (3) Assumption 3: Likeable Products Fulfil Gratifications

Finally, similarly to HCI researchers that approach users as purposeful and task oriented, U&G researchers make the assumption that people use media in order to serve their needs and fulfil their gratifications. This is an interesting perspective, especially in the context of designing for fun or for playful interaction, where the goal is not to produce output or accomplish productivity tasks but rather enjoying the process. With regard to the U&G paradigm, a distinction is made between *gratifications* that are *sought* (GS) and those that are *obtained* (GO) from media use. To meet the user needs, gratifications obtained should correspond with gratifications sought. In this respect, we formulate our final assumption: *in order to design likeable products for children, we need to fulfil those gratifications that children seek in specific media.*

## 2.1.3. Uses and Gratifications of Games and Play

Typically, research in the U&G tradition begins with the identification of the gratifications that are sought or the motivations for media use in relation to the traits of the audience. These studies tend to show no universal set of motivations or gratifications sought from media. Motivations vary across media, genres and user groups, and cultures [11]. However, several U&G studies (cf. [23, 24]) on traditional media with adults reveal the existence of four gratifications clusters that repeatedly occur:

- (1) information/surveillance,
- (2) personal identity,
- (3) integration/social interaction/personal relationships,
- (4) entertainment/division/escapism.

Recently, interesting studies have been conducted on video games and gratifications for young players. Sherry et al. [25], for example, conducted a survey (from elementary scholars to university students) in order to determine the uses and gratifications of playing video games. Sherry and Lucas [26] defined six gratifications that could explain why young people play video games:

- (1) competition: to be the best player of the game;
- (2) challenge: to push yourself to beat the game or to get to the next highest level;
- (3) social interaction: to play as a social experience with friends;
- (4) diversion: to pass time or alleviate boredom;
- (5) fantasy: to do things that one cannot do in real life;
- (6) arousal: to play for excitement.

Many more U&G studies exist and are carried out; in fact U&G is also seen as an excellent way to study new media [27]. New media credit users with even more control over their own activities. The active audience paradigm prevalent in U&G aligns well with new interactive media such as the internet or video games. In this respect, mass media scholars promote an adaptation of the U&G framework to new technologies: “A challenge is for researchers to adapt and mould the current conceptual framework to deal with new communications technologies” [28, page 241].

## 2.2. Expectancy Value Theory: From High Level Gratifications to Low Level Attributes

Typically, U&G studies result in a set of motives or gratifications that are still quite general or abstract. Let us recall the game gratifications that Sherry and Lucas defined: competition, challenge, social interaction, diversions, fantasy, and arousal. A designer might point out that these gratifications are interesting but do not provide useful operational guidelines for designing actual media products. Consequently, the U&G framework can be perceived as too abstract to offer concrete guidelines for designing interactive applications.

Therefore, to understand the relationship between the design of a media application and the gratifications of that media user, we rely on an extension/addition to the U&G framework. To make this transition, we rely on expectancy value theory, first introduced by Fishbein and Ajzen [29, 30] in the nineteen seventies and adopted and refined by many scholars and disciplines in later years.

### 2.2.1. Expectancy Value Theory

Expectancy value (EV) theory is based on the premise that all human behaviour (including media use) is shaped by behavioural intentions or attitudes. These attitudes are shaped by the expectations (beliefs) one holds about an object. In turn, these expectations are based upon specific attributes of the object. An expectation or belief then is the subjective (for the user) probability that an object has a given attribute. Furthermore, each attribute has either a positive or negative value associated with this expectation,

$$A_o = \sum_{i=1}^n b_i e_i. \quad (1)$$

As seen in the formal expression by Fishbein and Ajzen [29], the attitude towards an object ( $A_o$ ) is a function of a belief about the object attributes ( $b_i$ ) and the evaluation of an attribute ( $e_i$ ). Expectancy value theory acknowledges that users learn to choose a product (or medium) because they expect (believe) that the product contains attributes that are instrumental to achieving desired consequences.

### 2.2.2. Expectancy Value Theory and Uses and Gratifications

EV theory was first linked to U&G by Palmgreen. "A fundamental assumption of U&G models, that of an active audience, is in fact founded upon the even more basic precept that audience members do have perceptions of the gratifications available from various alternatives, and that they act upon these perceptions." [8].

User gratifications are shaped by (1) the expectancy or the perceived probability that using a media application will have a certain consequence and by (2) the evaluation or the positive or negative affect towards the consequence.

U&G researchers Palmgreen and Rayburn [8] explain this relationship. They see gratifications as a function of the user evaluation of a media object. More particularly, Palmgreen and Rayburn base themselves on Fishbein and Ajzen's formal expression [29] and state that the gratifications sought ( $GS_o$ ) in an object " $o$ " are a function of (the weighted sum of) the beliefs ( $b_i$ ) and evaluations ( $e_i$ ) about the attributes " $i$ " that object " $o$ " possesses. More specifically, the gratifications that users seek (or avoid) from a media object " $o$ " depend on the belief or the expectancy (=perceived probability) that " $o$ " has a particular attribute " $i$ " and the positive or negative evaluation of that attribute.

The expression results in the following formula:

$$GS_o = \sum_{i=1}^n b_i e_i. \quad (2)$$

The expectancies or beliefs about the product attributes can be learned and modified through direct experience, but might also be the result of communication and/or processes of induction and deduction [8].

One child might, for example ask his parents to buy a computer game about Peter Pan (i.e., object, " $o$ ") because he believes that he will like it (gratification sought or " $GS_o$ "). Although the child has never played this computer game before, he nevertheless expects the game to be fun because of the central character (i.e., belief associated with a certain game attribute, " $b_i$ "). Through previous experiences of watching the Peter Pan movie, the child learned that the adventures of Peter Pan are always fun and exciting (i.e., positive evaluation of game attribute, " $e_i$ "). However, if the child does not expect positive attributes or if he is convinced that the object only induces negative attributes, then he would not ask to buy it. The child may also, for instance, choose to quit playing the computer game because it is too difficult and frustrating (beliefs with negative evaluations) which makes him loose control of the game (" $GS$ ").

### 2.2.3. Means-End Theory

In contrast to our simple Peter Pan example, in real life the gratifications sought are mostly determined by more than one belief about a positive or negative attribute. Each gratification is indeed determined by a set of beliefs and evaluations of attributes.

Unfortunately, Palmgreen's elaboration of U&G with EV theory did not generate many research projects within the U&G tradition that focus on how media attributes influence the audience behavioural intentions. Nor did Palmgreen elaborate on methods to extract these beliefs from the audience. However, EV theory has not only been linked to social psychology and communication sciences. In consumer research, EV theory parallels research based upon means-end theory [6, 31, 32].

The common premise of means-end theory and expectancy value theory is that users learn to choose a product (or medium) because it contains attributes that are instrumental to achieving desired consequences and fulfilling values. The common generic means-end chain consists of attributes ( $A$ ), consequences or benefits ( $C$ ), and values ( $V$ ) [32]. The consequences of using a product in this case correspond to the "gratifications sought" within U&G research. In consumer research, means-end chains are used to explain what motivated consumers to desire certain products or product attributes. In human computer interaction, Subramony [33] and Zaman [34] successfully used means-end chains and consequently "laddering" as a qualitative research method to create design recommendations.

Means-end analysis is preferably done via laddering [31]. Laddering refers to an in-depth, one-on-one interviewing technique, used to develop an understanding of how users



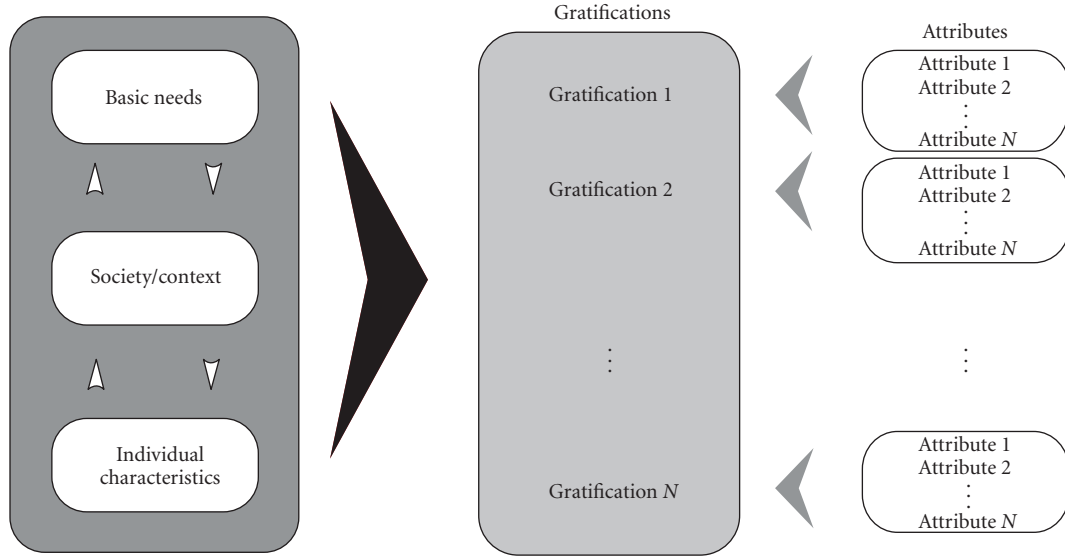


FIGURE 2: The extended likeability framework.

translate the attributes of a product into meaningful associations with the “self” [32]. Laddering involves a tailored interviewing format using primarily a series of directed probes, typified by the following question: “why is that important to you?” The goal is to identify linkages between key perceptual elements across the range of attributes, consequences, and values. These association networks or ladders, ranging from the concrete to the abstract, provide an understanding of the relations between a product’s attributes and the user motivational perspective to acquire this product. Laddering allows discovering the underlying reasons why an attribute is important, in relation to the underlying gratification.

### 2.3. Combining Uses and Gratifications with Expectancy Value Theory

To conclude the first section of this article, we posit that we should combine U&G and EV theory in order to research and design likeable products for a given audience in a given context. In Figure 2 we illustrate how basic needs, society and context, and individual characteristics lead to gratifications. We should also understand how these gratifications are based upon expectancies and evaluations of attributes. In order to design likeable toys and interactive applications for preschoolers in the home environment, we need to understand how basic needs, society and context, and individual characteristics lead to preschoolers’ gratifications that need to be fulfilled. Next, we need to understand which beliefs preschoolers hold with regard to the medium attributes and how these attributes are related to the gratifications of preschoolers. In the following section, we will discuss how we applied this underlying theoretical structure to a practical case for preschoolers.

### 3. CuTI: Applying the Extended Likeability Framework to Preschoolers in the Home Environment

Although many U&G studies are conducted on the gratifications for traditional media, and recently for digital media and games, no recent U&G or EV studies, to our knowledge, have been done on preschoolers and interactive media in the home environment. Therefore, we decided to take up a new research project, which we called CuTI [35]. CuTI is the acronym for “Cuddle Toy Interface,” an on-going project aimed at revealing those particular user gratifications and design attributes that support playful behaviour and fun activities of preschoolers within the context of the home environment.

The gratifications and attributes we find can inform the design of interactive toys and games in later stages. We emphasize that CuTI is an on-going project. The case here is offered to provide insight into how to apply the theoretical framework. We wish to emphasize that the specific gratifications and attributes uncovered in this initial study are preliminary insights, needing further validation with confirmatory research modes.

#### 3.1. CuTI Research Method

Researching five years old children in the home environment calls for appropriate research methods. A survey of what preschoolers prefer, and for what reasons, would not provide the in-depth information we were looking for, nor would this approach be effective with our young audience. Consequently, in [4, 34, 36, 37] we explain our child-centered methodology for researching the likeability framework.

Briefly stated, we first combined the existing literature on child-computer interaction and uses and gratifications

research on games. Armed with this information and with a preliminary and theoretical classification of gratifications [4], we conducted qualitative user research in order to refine our findings. More specifically, we combined user diaries and cultural probe packages followed by participant observations and depth interviews [36, 37].

As research participants, we selected 8 households with five years old children. During a time span of one week, we researched these preschoolers and their families at home. At the beginning of the week, the researcher explained the purpose of the project and handed over the package consisting of user diaries and cultural probes to the preschoolers and their parents. A first observation of the child and his/her social and physical environment was made. At the end of the week, the researcher collected the diary and probes. These user diaries and probes allowed refining and validating the gratifications [4]. Next, the researcher conducted an interview with and observation of the child, guided by the diary and the results of the probing activities. The goal was to better understand “why” these activities were considered fun, and to attempt to link attributes to the gratifications. Hence, for each of the activities listed in the diary we asked the preschooler to explain “why it was fun.” Because of the cognitive limitations of preschoolers, we converted the “laddering” method as listed in [33, 34] to “reflection in action.” Basically, we asked children to elaborate on why something was fun, while demonstrating the activity or playing the fun activity.

At the end of the interview session, the researcher completed the data collection by interviewing the parent(s), asking additional information on the fun activities and also on the parental attitude and influence towards these fun activities. For more detailed information on the specific adapted research methodology for preschoolers in the home environment, we refer to [4, 34, 36, 37].

### 3.2. Applying the Extended Likeability Framework

To illustrate the practical use of the extended likeability framework (ELF), we now “fill it in” with the findings of the CuTI project. The aim is not only to discuss the exploratory gratifications and attributes found but also to demonstrate how the ELF can easily be filled in and used as a concrete design guide.

Figure 3 presents our extended likeability framework. It illustrates how an interaction between basic needs, contextual societal factors, and individual characteristics influences the gratifications children get or seek. In total, we discern five different gratification areas that make things fun and likeable. We hereby assume that the more a product fulfils these gratifications and possesses the related positively evaluated attributes, the more the product will be likeable for preschoolers.

In the following paragraphs, we will discuss each part of the extended likeability framework. First, preschoolers’ basic needs, social and physical environment, and individual characteristics are dealt with (the left column of Figure 3). Then, we go into more detail on preschoolers’ gratifications

(the middle column). For every gratification, we will discuss how these gratifications are connected with the products’ attributes (the right column).

### 3.3. Basic Needs, Contextual Influences and Individual Characteristics of Likeable Applications for Preschoolers in the Home Environment

#### 3.3.1. Basic Needs

With “basic needs,” universal biological and psychological motives are meant [9]. Often in this context, the needs pyramid of Maslow [28, 38] is referred to. In his needs pyramid, Maslow [38] mentions organic and physical needs, the need for security and safety, the need for social experiences, the need for recognition and appreciations as well as the need for self-actualization [28]. Besides basic needs mentioned by Maslow, there is a general consensus that play from a functional perspective is necessary for learning and development. Based upon the work of several developmental psychologists and ludologists [39–43] we add the need to play as a universal, basic need for children.

#### 3.3.2. Society and Context

With “society,” we refer to the prevailing social, political, cultural, economic, and media structures. Since young children are our main target group, insight in their social and cultural context is crucial. Adults inevitably forget what it is to be a child. The contextual landscape has changed, so that adults no longer understand what it is to grow up as a child today. Moreover, each child differs from each other and may have grown up in a different social and physical environment. For our research in the context of the CuTI programme we limited ourselves to the nuclear family, consisting of two adults of both sexes, and one or more own or adopted children.

#### 3.3.3. Individual Characteristics

Individual characteristics typically refer to the psychological nature and demographic characteristics of the audience. Rosengren [10] makes a distinction between intra- and extraindividual characteristics. The intraindividual characteristics encompass, for example, the personality traits and developmental stages, whereas someone’s social position is an example of an extra individual characteristic.

### 3.4. Gratifications and Attributes of Likeable Applications for Preschoolers in the Home Environment

We now focus on the high level gratifications and low level attributes of likeable products. To arrive at the gratifications, we first combined the existing literature on child-computer interaction and uses and gratifications research to derive a

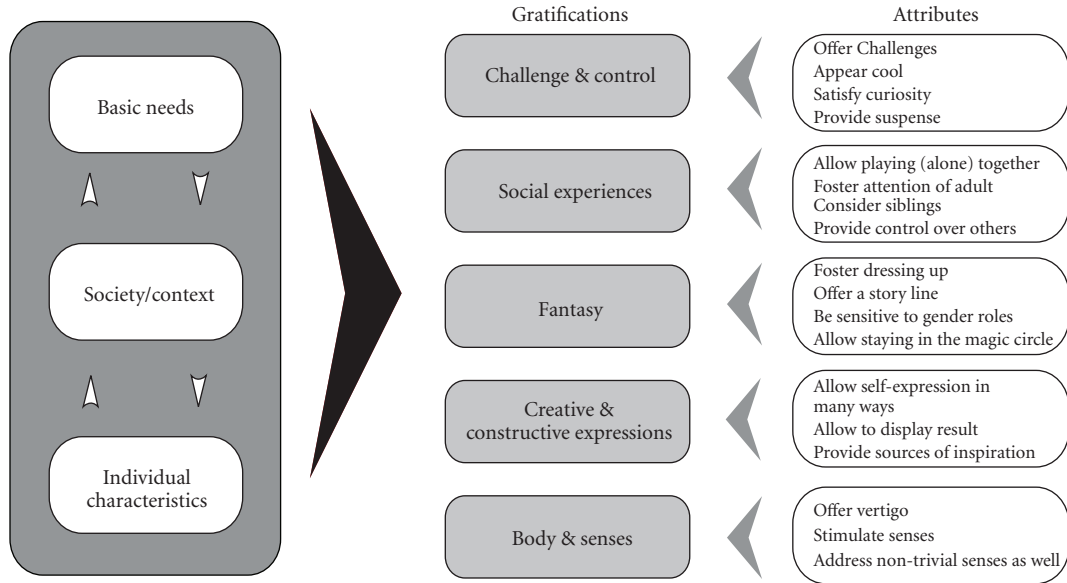


FIGURE 3: The extended likeability framework as applied to preschoolers in the home environment.

preliminary list of hypothetical uses and gratifications. Next, we conducted qualitative user research that allowed us to refine our list of gratifications and to come up with our definitive list of hypothetical gratifications. To arrive at the attributes we defined gratifications as a function of beliefs and evaluations of particular attributes.

We emphasize that we do not contend that our list of attributes is exhaustive (more research is needed to be able to claim reasonable exhaustiveness), nor do we pretend that one media application should try to incorporate all these attributes. Yet we do think that a list of attributes, such as the one derived from initial research such as ours, can inform the research community and help to understand the diverse gratifications and the ways to translate these into design solutions.

### 3.4.1. Gratification “Challenge and Control”

With “challenge and control,” we adopt Csikszentmihalyi’s theory of flow [44]. Flow theory deals with the fact that, in order to be truly challenging and “absorbing,” an activity or task needs to address the right skill level. If the task is too easy it becomes boring; if it is too hard it becomes frustrating. If the challenge is tuned right, however, activities become so rewarding that they are done just for the sake of “doing it.” Challenge is thus intertwined with development, with learning new information and mastering new skills. This gratification is also well researched and addressed in the research on child-computer interaction [45–48]. In our framework, “surprise” is conceptualized in the category of challenge. Surprise, control, and challenge are indeed important catalysts for likeability [49, 50].

### 3.4.2. Attributes of “Challenge and Control”

Addressing the right skill level, not too hard, not too easy, was very important for our preschoolers. Learning is part of this

category and often mentioned as fun, for example, learning about dinosaurs. In our CuTI project, children often stressed that something was “very hard” in a proud way. To them, it was important that things were “not for babies.” Being “cool” often involved a challenge or “danger.” Children with younger siblings stressed that they could do things younger siblings could not. The other way around, children with older siblings really wanted to be able to do the same thing as their older brother or sister. Part of the challenge was also that things are unpredictable and satisfy curiosity. Fun activities that surprised or provided suspense (slimy worms, jack-in-the box, etc.) were popular. However, being scared could quickly turn aversive and become really scary. Especially because of the (sometimes) blurred boundary between the real and the magic world, we observed that some activities were on the edge of offering too much suspense at the expense of losing “control.”

We conclude that likeable media objects that focus on fulfilling the “challenge and control gratification” should consider the following attributes: (a) offering the right challenge, not too easy, not too hard; (b) appearing “cool” (as for older children or a little dangerous) and not for “babies”; (c) satisfying curiosity, offer something new; (d) Provide suspense while not being too scary.

### 3.4.3. Gratification “Social Experiences”

With this category, we refer to fun activities that occur in the presence of others. Rice offers the classification of play according to the degree of social involvement: unoccupied play, solitary play, onlooker, play, parallel play, associative play and finally cooperative play. All these different types of play indeed came up during our research.

Based on Schutz’ interpretation [51], we distinguish between activities that point towards “inclusion” (being a member of a social group), “affection” (expression of being

accepted), and “control of others” (being able to have an influence on others). Stelmaszewska et al. [3] and Jansz and Tanis [52] also refer to the positive relation between social experiences and likeability. Offering social experiences is important for the likeability of a media application.

#### 3.4.4. Attributes of “Social Experiences”

With “social experiences,” we denote activities that refer to being together with/or in the presence of others. Although preschoolers have an egocentric worldview, this certainly does not mean a lack of interest in social experiences. In our project, the activities that were mentioned as most fun by our subjects often implied the cooperation of a parent, sibling, or friend. However, playing together did not always literally mean playing “together” (associative or cooperative play). Often, playing together pointed to individual play, but still within the presence of a family member or friend (onlooker play, parallel play). Clearly, “playing alone together” was still preferred over “playing alone” (solitary play). We noticed that siblings were eagerly present to “disturb” or “facilitate” play, and again affected the fun activity profoundly. Furthermore, we noticed that the (undivided) attention of a parent or other adult was of particular value. Such activity often ended up as the most fun of the day. Also activities that involved no direct social experience but ensured inclusion in a social group indirectly were popular, for example, watching a television show in order to be part of the group. Finally, control over others was an important issue; being “the boss” or having a “dominant” role in playing was important, for example, being able to decide “who’s next.”

We conclude that likeable media objects that focus on fulfilling the “social experience gratification” should consider the following attributes: (a) allowing playing together or if not possible allowing playing “alone together”; (b) stimulating playing/attention of adults; (c) considering the siblings in the environment; (d) providing a sense of control over others.

#### 3.4.5. Gratification “Fantasy”

With “fantasy,” we include all activities that address role-playing, pretense play (also referred to as dramatic play or symbolic play), mimicry, and make-believe [39, 41]. Make-believe concerns the imagination of objects and events without any immediate link to the real world. According to developmental psychologists such as Berk [39, pages 217, 224], fantasy is a very important activity for preschoolers. With preschoolers, make-believe becomes more and more complex. From the age of three year, children can easily imagine objects or situations without an immediate link with real life. Through fantasy experiences, children can go beyond the boundaries of normal experience. This can make them feel more than what they really are. We found that fantasy and role-playing are extremely important and often precede the other components of fun activities, or coordinate the diverse other components of fun activities.

#### 3.4.6. Attributes of “Fantasy”

With “fantasy,” all activities that address role-playing, pretense play, mimicry, and make-believe are concerned. As for our project, we found that dressing up and objects that support fantasy roles (e.g., fairies or pirates) as well as everyday roles (e.g., construction worker, caregiver) were very popular. Offering a story that stimulated children to enter into a world of fantasy seemed to guarantee “fun.” We noticed a strong gender disparity, where it was important that children could stay within consistent gender roles. Girls want to be princesses, boys want to be knights. Gender neutrality is accepted, but inverse gender roles inhibit play (e.g., a girl refused to play with a “male pirate” pawn).

Together with “fantasy,” we encountered the magical thinking that is a characteristic of children of this age. While we observed role-playing, the boundaries between the real and the fictional world often disappeared, for example, snapping out of a role was often found difficult. Children placed a great weight on their imaginary lives and roles and liked to keep on their dresses and makeup when switching to another activity, they liked to stay in their “magic circle.”

We conclude that likeable media objects that focus on fulfilling the “Fantasy gratification” should consider the following attributes: (a) fostering dressing up; (b) offering a story; (c) offering gender-sensitive or neutral roles; (d) allowing for staying in their magic circle.

#### 3.4.7. Gratification “Creative and Constructive Expressions”

Important to preschoolers is the need for self-expression and self-disclosure, materialized or expressed in a noticeable way. This gratification concerns activities such as drawing, painting, modelling, constructing, storytelling, singing, and so on. Creating or constructing something is especially common between the ages of three and six years [39, page 251]. As preschoolers get older, their creative skills develop. Not only the process matters but also the end product. Five years old children are aware that they can create something and are proud of it. They have a need for appreciation and recognition of this. Artefacts of preschoolers become an alternative way to express feelings and thoughts.

#### 3.4.8. Attributes of “Creative and Constructive Expressions”

In the CuTI project, we noticed that children could really be absorbed into expressive activities such as drawing, painting, handicrafts, but also constructing, carpentry, storytelling, and so on. Our preschoolers even liked simply sorting objects according to colour or shape. We found that activities that allow expression should contain attributes that both inspire and guide the activity. On the one hand, one should provide an example of what can be made (such as a mould or a picture), but on the other hand the child should be given enough flexibility to still “own” the creation. If the activity merely consists of putting an object in the right place, then



it does not allow the child to demonstrate his/her creativity. Whether it is drawing, building, modelling, and so forth, it is very important that there is a clear result that can somehow be demonstrated. The prospect of having created something that can be shown or that can “last” is part of the pleasure of creation.

We conclude that likeable media objects that focus on fulfilling the “creative and constructive expressions gratification” should consider the following attributes: (a) allowing self-expression in a myriad of ways; (b) allowing a result that lasts and can be displayed; (c) providing sources of inspiration.

### 3.4.9. Gratification “Body and Senses”

Finally, “senses” refers to all behaviours in which the senses are involved such as eating, tickles, watching colour patterns, making strange noises, and so on [41]. Besides, these sensory stimulations, children are also keen on physical sensations (“body”) such as jumping and running very fast. Roger Callois addressed this category of play based on bodily action as “vertigo” [53]. According to Berk [39], even simple repetitive motor movement can be considered the earliest form of play. We found that sensory stimulation in all its forms (not just motor movements) is important and considered fun for our preschoolers; it is not essential to distinguish between input or sensory perception (senses), and output via the motor system (body), as these blend into each other.

### 3.4.10. Attributes of “Body and Senses”

When focusing on current games, certainly on video games, the gratification “body and senses” is often not addressed, or narrowed down to impressive graphics, sound, and “button bashing.” However, we found that “all” senses are important. Our preschoolers loved things that move around, make noises, have bright lights, and have a soft touch or nice smell. Further, games that involved tickling, massaging, cuddling, or touching were very popular. To our surprise, many fun activities also included eating; something we did not expect to find, but that appeared in the observations of most children. Finally, not surprisingly, children loved activities that involved running around, jumping, tumbling, which we summarize as “vertigo.”

We conclude that likeable media objects that focus on fulfilling the “creative and constructive expressions gratification” should consider the following attributes: (a) addressing vertigo; (b) addressing senses, also nontrivial senses such as smelling or tasting (eating).

### 3.4.11. Combining Attributes

It is important to realize that most activities involved several gratifications and many attributes, for example, “taking a bath with mom” both involved “body and senses” and “social experiences.” “sorting out pearls” was about “creative and constructive expression” but preschoolers also liked the

activity because the colours or shapes were in attractive colours, which points to “body and senses” and is related to the “fantasy” gratification. “Walking in between sheep” involved “body and senses” but also “challenge and control.” In fact, none of the activities that were listed could be narrowed down to one gratification, but oftentimes involved two or three of them.

## 3.5. Summarizing Gratifications and Attributes

To summarize, we believe that when designing likeable applications for preschoolers, we need to fulfil the gratifications mentioned in our likeability framework: challenge and control, social experiences, fantasy, creative and constructive expressions and body and senses. As for the CuTI case, the framework implies that an object will be likeable if preschoolers can obtain these gratifications from it. More particularly, we found that if the attributes mentioned in our extended likeability framework (see Figure 3) are provided, then the gratifications sought by preschoolers can be obtained. Because preschoolers will evaluate these attributes positively, they will also actively engage in using the media object and perceive the media object as “likeable.” The more gratifications that can be obtained, the more likeable an object seems to be.

## 4. Discussion and Future Work

With the emergence of new technologies, the HCI community is fully aware of the need for theories and methods for likeability research. In this article, we aimed at demonstrating how the uses and gratifications paradigm together with expectancy value theory could fill in one of the blanks in designing likeable applications for preschoolers.

The paper remains exploratory, at best hypothesis-generating, in the methods used to elicit responses, in the list of attributes and gratifications derived and in the proposed structure linking these. At the same time, this outlines the further efforts are needed to achieve progress in this area.

As for the model structure and links, further inquiry into means-end analysis might help us to refine or to validate the ELF. As for the attributes and gratifications mentioned in our applied model, they should be considered as inputs for further confirmatory and structured research, provided that appropriate structured research tools can be found or developed to study and interview our young target audience. This brings us to our last endeavour. We are dealing with younger, not yet literate children, and we need to further investigate methods appropriate for eliciting responses from our young targets. Adapting research methods to preschoolers, such as the laddering technique, is a challenging but necessary condition in order to conduct further research.

Therefore, although we are convinced of the possibility of the ELF, we do not pretend that this framework is already fully established. However, we are convinced that the blueprint of the ELF can serve as a practical guide in many third-wave research projects dealing with broad issues. Furthermore, we hope that the list of gratifications

and attributes, such as the one derived from our “initial” research, can inform the community and help to understand the diverse gratifications and the ways to translate these into design solutions.

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