Game Engagement Theory and Adult Learning

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Abstract

One of the benefits of computer game–based learning is the ability of certain types of game to engage and motivate learners. However, theories of learning and engagement, particularly in the sphere of higher education, typically fail to consider gaming engagement theory. In this article, the author examines the principles of engagement from games designed for entertainment, applies these principles to the design of learning activities, and presents a model of learning engagement. The article examines literature on computer games and engagement, draws together the findings from a series of interviews, and applies these in an educational context. The author hypothesizes five factors that contribute to engagement with a learning activity and provides an example of the use of these factors in practice. The article concludes by considering further potential applications of the model.

Keywords

One of the advantages of using certain types of computer game in education is their ability, for many learners, to engender engagement and motivation, which contributes to effective learning. Not all games will engage to all students in all situations, but certain games, when used in appropriate and pedagogically sound ways to support learning, have the power to engage learners in a profound way.

Researchers and practitioners in the field of game-based learning often assume that computer games are intrinsically motivational for most, if not all, people (e.g., Oblinger, 2004; Prensky, 2001). This supposition is most frequently put forward in the field of young people and learning, but it certainly cannot be applied wholesale to learners in Higher Education (if, indeed, it can be applied to children or younger learners). This

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article does not aim to endorse the belief that the primary benefit of games-based learning is to motivate and engage students. However, it supports the following cautious assertions:

1. Well-designed and appropriate computer games can promote engagement.
2. More crucially, they have the potential to be effective learning environments.

Many games researchers have previously focused on the perspective of the design of games for entertainment and on what makes this type of game engaging. However, much of the knowledge gained from this field fails to make its way into the educational arena, although some examples do exist of significant work carried out to apply gaming engagement principles to education (e.g., Dickey, 2005; Garris, Ahlers, & Driskell, 2002). This article considers previous research on the nature of engagement with computer games and the application of this to create a model that explains student engagement with learning.

A recent point of discussion in the U.K. higher education community has centered on "how to make learning fun" and whether it is even appropriate for learning to be fun in this context. By focusing on "engagement" as a concept rather than "fun," this article aims to overcome the debate about whether fun learning can be seen as "too easy," "frivolous," or "inappropriate" in the sphere of adult learning. Fun can be a component of an engaging experience, but not an essential one; for example, it is possible to be highly engaged in a harrowing film, but it is not a particularly fun experience.

Although fun may be a by-product of learning, this article argues that it is learner engagement that is important for creating effective learning experiences. Jaques, Preece and Carey (1995) argue that designing interactions to be engaging can encourage and facilitate learning, and Lepper and Malone (1987) provide evidence that a link exists between intrinsic motivation to learn, engagement, and instructional effectiveness.

A recent research project that compared levels of engagement for students using two different collaborative online games necessitated the development of a questionnaire to measure postexperiential engagement. This article describes the process of elicitation of the factors of learner engagement from examination of the literature on gaming engagement, as well as some original research. The author subsequently developed a measurement instrument from these factors, but this article does not describe this process in detail because further details are already available elsewhere (see Whitton, 2007). The focus of this article is on using existing research on gaming engagement to provide a model of learner engagement, specifically in the context of adult education.

The first section, on the background to the model, describes the basis for the factors that make up the model. It contains two subsections: the first is an overview of some of the relevant literature on engagement and games; the second describes a small-scale study undertaken to understand the area in greater depth. The next section, on engagement with learning, presents the model for engagement with learning. It also contains a subsection that provides an example of a potential application of the model. Finally, the conclusions consider the limitations and other potential uses of the model.

Background

To develop a framework for understanding engagement with learning, two activities were undertaken. First, the author undertook a literature review of theories of gaming and engagement, and the following subsection contains a description of the key theories. Second, a small-scale research study took place, which examined learners' perceptions of games and their motivations to play them. The subsequent subsection contains a description of this study.

Literature on Theories of Engagement With Games

Although "engagement" does not have a single agreed definition, the factors that contribute to it, or how it can be measured, the area of computer gaming is one in which the concept has been much studied. This section examines at some of the key theories associated with computer games and engagement.

> Benyon, Turner, and Turner (2005) describe engagement as being concerned with all the qualities of an experience that really pull people in—whether this is a sense of immersion that one feels when reading a good book, or a challenge one feels when playing a good game, or the fascinating unfolding of a radio drama. (p. 61)

They identify and describe elements that contribute to engagement in virtual environments, including a sense of authenticity of and identification with the environment, ability of the environment to adapt to the actions of the user, a compelling narrative, a sense of immersion, and creating an experience of flow (Benyon et al., 2005, based on Shedroff, 2001).

Many games researchers use flow theory (Csikszentmihalyi, 1992) as a way of understanding the compelling nature of digital games (e.g., Cowley, Charles, Black, & Hickey, 2008; Moreno-Ger, Burgos, & Torrente, 2009). It focuses on the state of optimal experience, thought to bring happiness, and is described as "the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (Csikszentmihalyi, 1992, p. 4).

Flow theory puts forward the notion that certain factors add to the enjoyment of an experience, and the more of these elements that are present the more enjoyable, engaging and immersive that experience is. The factors that the theory describes are the following:

1. a challenge that requires skill to achieve with an attainable goal and known rules
2. complete absorption in the activity
3. clear goals
4. immediate feedback

5. concentration on the task in hand
6. a sense of control, lacking the sense of worry about losing control
7. loss of self-consciousness
8. transformation of time

Although flow theory is a useful starting point for considering the nature of engagement, a problem arises in using it for measurement because some of the indicators it uses can be objectively analyzed (e.g., the existence of goals and rules) although others are based on the subjective perception of the player (e.g., loss of self-consciousness).

In his analysis of flow theory, Draper (1999) adds that engagement only occurs where a connection exists between the activity and the player's core values and beliefs, while Salen and Zimmerman (2004) argue that flow is not intrinsic to a game, but is dependent on the state of mind of the players as they play the game. In the context of the research presented here, engagement is considered to be as a subjective state observable only to the individual taking part in the activity, so that it is not the activity, in itself, that is engaging but, rather, an individual's interaction with the activity at a specific time. Being in a state of "flow" is considered here to be a similar state to being highly engaged, and the use of flow theory described in subsequent sections is focused on the elements that relate to the perceptions of the player rather than those that look at the design of the experience.

Malone (1980) produced some of the original and seminal work in the field of computer gaming and engagement. He investigated the elements that make computer games engaging and considered how to use the features that make computer games captivating to make game-based learning more interesting and enjoyable. Malone initially presented three aspects of games that lead to increased engagement: challenge, fantasy, and curiosity.

Malone (1980) argued that the use of obvious, compelling, and adaptable goals, coupled with an uncertainty of achievement of these goals, provides a way of creating appropriate challenge. He also asserts that short-term goals are more motivating than long-term goals and, perhaps more controversially, that fixed goals (e.g., winning a game) are more motivating than emergent goals (e.g., painting a picture). To ensure engagement, Malone sees creating the optimal level of challenge for an individual as crucial, and he says that "an environment is not challenging if either the person is certain to reach the goal or certain not to reach the goal" (p. 52).

The second aspect of games, fantasy, can be intrinsic, where the learned skill or knowledge is closely related to the fantasy, or extrinsic, where the skill does not depend on the fantasy. Malone (1980) states that intrinsic fantasies are generally more interesting and instructional and extrinsic fantasies serve wish fulfillment and conflict-resolution functions. Recent research has shown that intrinsic fantasy produces significantly higher learning effects than extrinsic (Habgood, Ainsworth, & Benford, 2005). Malone (1980) describes the third aspect, curiosity, as either sensory, for example, using light or sound, or cognitive, which involves providing puzzlement or mystery that stimulates people to learn more to ensure that their understandings are complete and consistent. Provision of appropriate constructive feedback is important to add value and stimulate curiosity further.

Malone and Lepper (1987) extended Malone's (1980) original theory to include a fourth factor that influences engagement with computer games: control. They decompose control into three elements: contingency, where results are clearly the results of actions taken; choice, where a large number of options are available; and power, where any decision has the potential to have a powerful effect.

Two points arise regarding the value of Malone's (1980) work as related to adult learning today. First, he worked with children, and although the findings may be replicable with adults, evidence of this is limited. Although some of the factors intuitively make sense when applied to adult engagement (e.g., goals, control), other factors are possibly less compelling (e.g., fantasy). Second, Malone's work took place more than 30 years ago, during a period when computer games were new to most children and had a far greater novelty value. Today games are ubiquitous and players are far more sophisticated in their expectations. Even so, Malone's work is still regularly used as a basis for work on game design and engagement (e.g., recent references include Dempsey, Haynes, Lucassen, & Casey, 2002; Dickie, 2006; Ebner & Holzinger, 2006; Sandford & Williamson, 2005) and has been endorsed and applied by many other researchers since its inception. In the context of this article, Malone's work is still valid, but applied with some caution.

Researchers have made links between engagement in games and engagement in learning by other researchers. Koster (2005) argues that it is the learning inherent in games themselves that makes them engaging, saying, "fun from games arises out of mastery. It arises out of comprehension. It is the act of solving puzzles that makes games fun. In other words, learning is the drug" (p. 40). He says that games become boring when they fail to provide new information to integrate into existing understandings and that creating an engaging game is about getting the balance right between providing the right amount of information to stimulate curiosity while not producing sensory overload.

Researchers have also examined the use of humor in games and its relationship to engagement. Dorman and Biddle (2009) present a range of different theories of humor in game play and suggest that it serves social, emotional and cognitive functions. They suggest that enhancing games with humor could increase engagement, but do caution that use of humor is not easy and can be culturally specific.

The literature on games and engagement presented here provides a brief theoretical background to the ways in which games can engender engagement. This provided the theoretical basis for developing a model of engagement with learning. To complement the existing literature on the topic, a small research study was carried out, which focused on the ways in which adult learners perceived games, the ways in which they engaged with games, and the perceived appropriateness of games for learning. The following subsection describes this study.

Research Study Into Learner Engagement With Games

The author undertook the research described in this subsection as a precursor to the development of a framework for understanding the components of engagement with learning. This framework informed the development of a questionnaire for measuring

postexperiential engagement with an activity, as part of a wider study to investigate the potential of collaborative computer games for learning (see Whitton, 2007). This small research study aimed to build on the research literature in the field of games and engagement and explored the perceptions of a cross section of adult learners. It examined the appropriateness of games for learning and the elements that the participants found engaging about games.

The author conducted a series of 12 in-depth interviews, the main objective of which was to develop a wider understanding of the range of adult learners' attitudes toward games and computer gaming and their experiences of engagement with the other recreational activities they undertook. Overall, the interviews focused on what characteristics of an experience the participants saw as contributing—both positively and negatively—to engagement.

Application of the phenomenographic methodology (Marton, 1981) provided an approach for data collection and analysis of these interviews. Phenomenography is a research approach, used primarily in the field of education and designed to answer questions about how different people perceive different aspects of reality. The aim of phenomenography is not to make statements about the world, but about people's conceptions of the world. This methodology provides a structured approach to the analysis of interviews and focuses on the different conceptions that exist—in this case regarding engagement. However, this stage of the research was essentially a miniphenomenography because of the smaller number of participants than normally used for this type of study.

The interviewees were currently studying in Higher Education or had previously studied at that level. Twelve was a sufficient number to draw out a range of themes and opinions without making the amount of interviews or the associated transcription and thematic analysis unmanageable within the timescales allowed. An equal number of males and females participated, with ages falling into all categories from between 20 and 29 years to 60+ years. Half of the individuals who took part in the study considered themselves "game players" and half saw themselves as "nongame players" (i.e., people who play games by choice as a matter of course and those who do not). Each interview took between 30 and 90 minutes and was transcribed and analyzed iteratively to bring out themes and commonality of opinion among the participants.

The primary outcomes of phenomenographic research are categorizations of description, which look at the range of ways in which people perceive a phenomenon, and the motivations for game playing that emerged from this study are described elsewhere (see Beasley & Crerar, 2004). A second outcome of the interviews was identification of a series of factors that contribute to engagement (or disengagement) with games. These factors are of particular interest in the context of this article. Six factors emerged clearly from the analysis of the interviews, which appeared to contribute to gaming engagement, either positively (two factors) or negatively (four factors) for both game players and nongame players alike.

The two factors that contributed positively to engagement with an experience were

1. being able to see swift and steady improvement
2. a perception of being good at an activity

Many of those interviewed felt that the ability to undertake an activity and see imme-diate, continual, and ongoing improvement as an important motivational factor, which is consistent with the research on what makes games motivating for children (Malone, 1980). As well as having a perception of improvement, a feeling of "being good at something" in the first place (not always easy for someone starting any new activity) was seen as being motivating. This may be associated with the motivational aspects of being in control of a game (Malone & Lepper, 1987).

The four factors that the interviews highlighted that were considered to negatively contribute to engagement were

1. difficulties in getting started
2. being stuck during the activity
3. lack of trust in the environment
4. intrinsic boredom with the subject matter or activity itself

A theme that emerged was the importance of being able to start to play a game quickly without having to spend too long learning the rules, etiquette, and parameters. The participants felt that a game that is difficult to get into, without clear and helpful instruc-tions, was very demotivating. When an individual undertakes an activity for the first time, he or she is likely to be less skilled (something identified as demotivating in itself) so it is of increased importance therefore that he or she can get started quickly (and see a swift initial improvement).

The issue of being stuck for a long time at a certain point during a game, for instance, reaching a plateau in skill level or being unable to solve a particular puzzle and not being able to progress, was seen as producing a negative effect on engagement. This is particularly true for this group of adults who place an extremely high value on their time and do not want to "waste" it. As Malone (1980) highlighted, it is important to make sure that the levels of challenge are appropriate to the skill level of the participants (e.g., through customization or gradual increases in difficulty). A difference should exist between "getting stuck, but being able to continue after some thought" (leading to a feeling of satisfaction and achievement) and "getting completely stuck" (leading to frustration and demotivation).

Several of the interviewees highlighted a third negative factor that occurred when they lost trust in the environment of the game itself, that it was seen to be biased, unfair, or simply incorrect. For example, when answers in a quiz game were wrong or when the game rules did not appear to be transparent or consistent.

The fourth factor, and perhaps one that is more difficult to address, is a deep-rooted boredom or lack of interest in the underlying subject of the game. This is of particular interest because it goes against the assumption that "students are motivated to learn material (e.g., mythology or math) when it is required for successful game play – that same material may otherwise be considered tedious" (Oblinger, 2004, p. 13). Particu-larly in the case of adult learners, it cannot be assumed that a game dynamic in itself will make something interesting if the learner has an intrinsic lack of interest in the

Table 1. Factors That Contribute Positively or Negatively to Engagement

Direction	Factor	Description
Positive	Improvement	Being able to see swift and steady improvement from the start of play
	Ability	A perception of being good at playing the game
Negative	Starting out	Not being able to start play easily, not recognizing the game goals, or being unable to use the game interface
	Getting stuck	Reaching a plateau or being unable to solve a puzzle or section of the game
	Trust	Lack of faith in the fairness of credibility of the game
	Boredom	Genuine lack of interest in the game subject or dynamic

subject itself. A summary of the six factors that emerged from the series of interviews is provided in Table 1.

It was a unanimous finding from the interviews that the participants would not be prepared to learn from a game simply because it was a game, and it made no difference whether or not they were predisposed to play games in their leisure time. However, every participant also said that he or she would be willing to try game-based learning, but only if it was felt that the game was an effective and appropriate way to learn and had a clear purpose in the learning process.

This study highlighted six elements that are present in games and contribute to player engagement. Although these findings may be useful, it is worth pointing out the major limitation of the study being its size in terms of the number of individuals interviewed. However, the author felt that 12 was sufficient to highlight a range of issues without becoming unmanageable, and readers should note that the six factors described in this section do not purport to be a complete set, but were used to supplement the existing literature on gaming and engagement.

The next section draws together the results of these interviews with the literature on engagement from the gaming field to create a model for understanding the nature of engagement with learning. It presents the model, with a series of factors that the author hypothesizes contributes to student engagement, and describes the use of the model in practice (providing evidence of its validity).

Understanding Engagement With Learning

The first subsection that follows contains a description of a model for theorizing engagement with learning. This model was the basis for the development of an attitudinal scale to examine and evaluated postexperiential engagement with educational games and other learning activities in the context of Higher Education (Whitton, 2007). The second subsection provides some evidence of the validity of the model by briefly describing subsequent work to produce the questionnaire.

A Model of Engagement With Learning

To develop a model of engagement with learning, first the literature on games and engagement was reviewed to draw out factors from theory that influence engagement with games and to consider the appropriateness of these in the context of adult engagement with learning. The author then integrated these factors with the motivational and demotivational aspects that emerged from the original research undertaken. This allowed the creation of a model based around five factors that contribute to the concept of engagement with learning.

Two theories of engagement with games provided the basis for the model. Flow theory (Csikszentmihalyi, 1992) was a central component, but after acknowledging that flow is an extreme form of engagement and that it is possible to be engaged to some level although not actually in a state of flow. The work of Malone (1980), in terms of challenge, curiosity, and control, also contributes, taking into account the limitations of its appropriateness to adult learners.

As adult engagement with learning is fundamentally different in some respects from engagement with games, the model also draws on adult learning theory. The theory of androgogy (Knowles, 1988) highlights adult motivations for learning and argues that adults (as opposed to younger learners) have different motivations and reasons for learning. In particular, they need to know why they should learn something before they are willing to invest time and energy in learning it and become ready to learn something when they need to apply it to be able to cope effectively with real-life situations.

In addition to these theories, the results from the interviews described in the previous section contributed to this model of adult engagement with learning. The author reviewed the factors highlighted by each piece of research and compared them with the factors highlighted by other areas to draw out a list of most commonly occurring potential factors for the model. The next step involved their consideration in respect to appropriateness in the context of adult engagement with learning and the removal of those that were not relevant in this context. The final model comprises five factors, described in Table 2.

For the most part, these factors are self-explanatory in terms of their association with the prior research in the arena of games and engagement described previously in this article. Challenge is the idea of an activity that requires a skill, with clear rules and goals, and perceived as achievable, but nontrivial. Control encapsulates the notions of being able to make choices in the activity and for actions to have clear, fair, and consistent feedback. Immersion is the idea of absorption in and concentration on an activity, losing track of time and loss of self-consciousness. Interest is the idea of having an intrinsic fascination or enthrallment with the subject or context of an activity. It is worth highlighting the factor of purpose, as this is a dimension that would not necessarily contribute to engagement with a purely entertainment or game-based activity. However, it is a factor that is clearly important for adult learners (perhaps less so for children) with a more strategic approach to what, why, and how they undertake their learning.

Table 2. Learning Engagement Factors, With Description and Origin

Factor	Description	Origin
Challenge	The motivation to undertake the activity, clarity as to what it involves, and a perception that the task is achievable	Csikszentmihalyi (1992), Malone (1980). Original interviews
Control	The fairness of the activity, the level of choice over types of action available in the environment, and the speed and transparency of feedback	Csikszentmihalyi (1992), Malone (1980). Original interviews
Immersion	The extent to which the individual is absorbed in the activity	Csikszentmihalyi (1992)
Interest	The intrinsic interest of the individual in the activity or its subject matter	Original interviews
Purpose	The perceived value of the activity for learning, whether it is seen as being worthwhile in the context of study	Knowles (1988). Original interviews

The five-factor model of learning engagement described here supposes that each of these factors contribute to an overall sense of engagement with an activity and that the greater the extent to which each factor is present the greater the engagement; it does not attempt to assign an order of importance to these factors. Although this model was initially developed in the context of games and learning, it is hypothesized that it may have wider applicability to learning activities in general in the context of Higher Education, as each of the factors is also a mark of an effective educational experience as well as an enjoyable gaming one.

Researchers and theorists use the concept of "engagement with learning" in a variety of ways and to encompass different ideas. The most common methods employed to evaluate engagement in educational settings are the use of self-assessment questionnaires and measurements such as attendance rates (e.g., Chapman, 2003). Other techniques include analysis of facial expressions and body language (Hughey, 2002), observations (Read, MacFarlane, & Casey, 2002), and voluntary time on task (Virvou, Katsionis, & Manos, 2004). The analysis presented here of the factors that contribute to learner engagement has drawn on gaming engagement theory to broaden the understanding of engagement outside the traditional scope of educational engagement theory and provide a more structured analysis tool. The subsection that follows provides an example of the application of this model to the development of an engagement questionnaire, which gives an example of its potential use.

Example Application of the Model of Learner Engagement

This subsection describes the use of the learning engagement model, presented in the previous subsection, as the basis for developing a self-perception questionnaire for evaluating engagement. This questionnaire development process also provides some

validation of the appropriateness of the original framework as a basis for considering engagement with learning. It is the intention of this section to provide an example of the use of the model rather than a complete validation of it, so the section only provides a brief description here. Whitton (2007) provides a full description of the creation and testing of the questionnaire.

Although tools exist that examine player engagement with games (e.g., Brockmyer et al., 2009), in this instance, the model informed the creation of a tool for assessing user engagement with learning. To develop this engagement questionnaire, the author created a Likert-type scale questionnaire (e.g., where each question is a statement to which respondents can identify their levels of agreement) based on the five factors previously identified. This type of scale is widely used for evaluating this type of self-perception construct, so would be likely to be familiar to participants, is relatively straightforward to develop (Robson, 2002), and has established statistical analysis techniques (Greene & D'Oliveria, 1993).

Initially, by drawing on the literature in the areas, the author generated a large number of potential statements relating to each factor, and colleagues reviewed these for clarity, ambiguity, and language used. The author then revised and refined the original questions and created an initial 42-question scale, with questions covering each of the five factors. The next phase involved testing the questionnaire and reducing the number of questions to an appropriate number for actual use in a learning setting. The questionnaire was piloted by asking participants to play one or more of five online games. The games were selected because they were freely available; represented a range of different gaming types, interfaces, and game dynamics; were considered to have educational potential; and were diverse enough to elicit variation in response.

The questionnaire was piloted with a total of 33 participants, recruited by word-of-mouth from the population demographic. Each participant played a minimum of one game, although most played more than one, providing 65 responses in total. Participants were given instructions by e-mail, asked to play the selected game for 15 to 20 minutes in their own time, and complete and return the questionnaire immediately afterwards.

To refine the questionnaire, and provide evidence for the overall validity of the factor-based model, a number of statistical analyses were used, for example, checking that the statements used to indicate each factor correlated with one another. These enabled the development of an 18-question scale that can be used to measure perceived levels of engagement with an activity. Further detail on the techniques employed to develop the questionnaire, the final questionnaire itself, and an example of its use in a comparative experiment, can be found in Whitton (2007).

This questionnaire provides an example of the application of the learner engagement model to practice, and could be used in a variety of ways, for example, to compare levels of engagement or to gain a greater understanding of the elements that enhance or detract from engagement in different learning situations.

Conclusions

This article presented a model for understanding and analyzing the components of engagement with learning in the context of students in Higher Education. The creation

of this model drew on a combination of the academic literature on engagement with computer games and original research on engagement with gaming and learning. The purpose of this research was to exploit a research field that has already theorized the concept of engagement and try to apply this concept to engagement with learning. A greater understanding of the different factors that can influence engagement can help the educational community better appreciate what elements can add value to learning activities. For example, educators could achieve this by highlighting the importance of clear and achievable goals or acknowledging the significance of appropriate and logical feedback.

As well as providing a tool for analysis, this model of engagement provides a way of supporting the development and evaluation of effective learning activities. It highlights the need for appropriate challenge, control and feedback mechanisms, and support for immersion, stimulating interest, and highlighting purpose. Further research could usefully be undertaken to examine practical steps in terms of learning design to encourage engagement.

Although this model was the basis for developing an engagement questionnaire, during which process some evidence emerged as to its efficacy, it would still benefit from further scrutiny and additional evaluation. Future research in this area could include a larger scale series of interviews to further examine the components and consider how they could influence the design of learning in a range of educational and informal learning settings.

This model also does not explicitly take account of the processes surrounding the actual game play, such as briefing, reflection, and debriefing, but focuses on the experience of game play itself. The relationship between debriefing and engagement, in particular, is worthy of further investigation as this has such a significant effect on learning.

To conclude, this article aims to expand the debate on what makes effective learning and, in particular, highlight the importance of drawing on other disciplines to learn from previous related research. An understanding of engagement is crucial to understanding learning and, in this respect at least, previous work on engagement with computer games has a lot to contribute to a greater understanding of the nature of learning.

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Bio

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