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The Videographic Requirements Gathering Method for Adolescent-Focused Interaction Design

Tamara Peyton and Erika S. Poole

College of Information Sciences and Technology, The Pennsylvania State University, University Park, PA 16802 USA
{tpeyton,esp13}@psu.edu

Abstract. We present a novel method for conducting requirements gathering with adolescent populations. Called *videographic requirements gathering*, this technique makes use of mobile phone data capture and participant creation of media images. The videographic requirements gathering method can help researchers and designers gain intimate insight into adolescent lives while simultaneously reducing power imbalances. We provide rationale for this approach, pragmatics of using the method, and advice on overcoming common challenges facing researchers and designers relying on this technique.

Keywords: adolescents, mobile phones, participatory design, qualitative methods, videographic requirements gathering, vulnerable populations

1 Introduction

During adolescence, individuals transform from child to adult, with rapid changes in physical, cognitive, social, and emotional development through the process. Although legally still considered "children," [1] the needs and capabilities of adolescents differ from that of pre-school or school-age children, who have been the primary focus of child-computer interaction design guidance [2]. Overall, the interaction design literature offers little guidance on the unique needs, opportunities, and challenges of designing for adolescents [3], despite the fact that over 1.2 billion people worldwide are within this demographic [4].

Given perceived difficulties of obtaining consent for conducting research or design with minors [5], it can be tempting to use requirements gathering methods that do not rely upon direct interactions between adult researchers/designers and adolescents. Instead of directly engaging with adolescents, researchers and designers may rely upon voices of adult stakeholders in lieu of adolescent perspectives, or even assume that they themselves are sufficiently knowledgeable about the demographic because they once were adolescents, are parents to an adolescent or adult child, or are familiar with popular culture portrayals of teen life. Even if engaging with adolescents directly, many common methods used in gathering requirements can potentially stifle

and silence the voices of adolescent participants, or if drawing upon the child-computer interaction design literature may be perceived as being too "babyish."

In this paper, we introduce a new method for requirements gathering when conducting interaction design research or practice with adolescents. Intended to reduce power imbalances, the videographic requirements gathering method can help researchers and designers gain intimate insight into adolescent lives. In the following sections, we more thoroughly discuss challenges in gathering requirements for interaction design with adolescents, and then turn to the philosophy and pragmatics of videographic requirements gathering (VRG). We conclude with a discussion of the opportunities and challenges associated with this approach.

2 Defining Adolescence

What is meant by the term "adolescent"? Across and even within societies, the start and endpoints of childhood, adolescence, and adulthood differ. For example, in the United States, the National Institutes of Health considers anyone under 21 to be a child, the Food and Drug Administration consider persons under 16 as children, and the 50 states differ in their legal definitions of childhood, adolescence, and adulthood [1]. Although the onset of puberty—complete with a growth spurt and sexual organ development—appears to be a convenient starting point for delineating between childhood and adolescence, the onset of puberty has sex-based and individual variance. Physical changes typically attributed to "adolescents" may begin as early as the age of 6 or as late as 15 [6]. Neurobiological research further muddies the distinction between child, adolescent, and adult; recent findings suggest that ongoing changes to the human brain defining "adulthood" may extend into a person's 20s [7].

Also worth noting is that the phase of life known as adolescence is often confusingly conflated with the label 'youth' and is accompanied by a wide variety of possible age ranges [8-9] depending on which label is desirable and for what purpose. Youth, as a period of life, is variably considered to be between 13-19, 16-24, 16-30, or even 16-34. The explanations for the variance have to do with theories of psychosocial maturity around identity formations, as well as employment patterns, and consumerist or marketing designations. Arnett [8] labels this period of life uncertainty 'emerging adulthood', characterized as a phase of life that is inherently contradictory and conflicted, owing to life in a society that provides mixed messages about one's abilities and responsibilities [8,10]. This phase of life is marked as a period of immense change and confusion [11] in which there appear to be many possibilities but there are equally many uncertainties, more so than at any other period of human life. Overall, adolescence is a period of great upheaval, marked intensely by change, uncertainty and paradox.

The phase definition issue extends to youth themselves, leading to confusion about how to define themselves: are they adults, children, or something in between? When adolescents are asked if they were adults, Americans between ages 16-24 surveyed about their personal identities selected the response "in some respects yes, and in some respects no" [12]. That being said, a number of international researchers [8,10,13,14] have identified a set of three core criteria that most accurately reflect a majority of young people's views on defining adulthood in late capitalist societies.

These are: (1) accepting responsibility for one's self; (2) making independent decisions; and (3) becoming financially independent.

However, the very things that impact an adolescent's self-view of whether he or she is an adult can also affect ability to actually successfully transition into *being* an adult. Risky behaviors aside, the sometimes abrupt need to take responsibility for one's actions and to make informed decisions about one's person and life is difficult in a society in which young adults are often treated with derision, suspicion, or denial. For example, while many youth cited a full-time job as a criteria for being an adult, an adolescent's act of taking a job directly after finishing high school is seen as an adulthood marker by the adolescent, yet viewed as a poor life choice by older adults in authority, contributing to a tendency to see that working young person as immature and not adult [15]. According to this prevailing wisdom, the correct place for the adolescent to be after high school is in higher education. Given this, a youth who attempts to circumvent this by working immediately is seen to be lacking in the proper judgment expected of an adult.

Ultimately, North American culture still portrays adolescents as populations to both protect and distrust. Adolescents are expected to live in a state of flux, training to eventually become fully functional members of society, as workers, parents and taxpayers. However, even when given "adult" privileges by law, such as voting, owning weapons, or consuming alcohol and tobacco, older adolescents largely remain sheltered from full responsibility of many everyday activities and necessities through a period of 'emerging adulthood' [8]. By being expected to live at home, or at minimum be supported financially by parents while engaging in higher education, older adolescents are encouraged to delay becoming full members of society, through a cultural context that promotes a notion of the their path as being engaged in less 'serious' concerns, such as entertainment, fashion, and peer network socializing [10,16].

In technology design, the paradox of the adolescent concept is intensified. On the one hand, there is the discourse of adolescents as 'digital natives'[17,18], comfortable with technology and fluent in its nuances of use. That discourse is positioned equally against the conceptualization of adolescents as endangered by Internet pornography and adult predators [19], at risk through insufficient awareness of online privacy maintenance [20,21], and through inadequate computational skills relevant to technical and knowledge work careers [22]. Yet, as multiple scholars have pointed out [23,24,25], the reality of adolescents' digital prowess and technological literacy is heavily contextual, inflected by their environmental, social, and familial environments and attitudes. We align to the latter position, arguing that understanding the contextual issues of an adolescent population's daily life in situ is necessary for successful interaction design practice. It is for this reason that we adopt the traditions of action research, as embedded in Participatory Research (PR) and Participatory Design as a guiding philosophy when working with adolescent populations around interaction design.

3 Participatory Research and Design as a Foundation for VRG

Bringing adolescents into the interaction design process as collaborators in their own right requires innovative thinking about research and design process, not just about the end product of creating a technological artifact. Participatory Research (PR) is an activist-focused philosophy that focuses on the role and involvement of all stakeholders within a project. PR advocates for the development, empowerment and promotion of participants who might be impacted by the activities and developments within a project's scope [26]. Change agendas of many PR projects focus on international development, organizational change, community development, or community and individual health. PR pays close attention to the context of research, and keeps research activities closely aligned to their ecological context and to the people most often heavily affected by change initiatives. Within PR projects, participants are most often workers and laborers—that is, individuals who typically do not get a voice within their organizations around change activities.

Participatory Design (PD) is a design-focused philosophy that attempts to transform the ideological and material conditions of a given population, based on the democratization and deep adaptation of technological research and development to underserved human populations [27]. Participatory design attempts to minimize privilege and vertical power structures [28]. The philosophy of PD is inspired by the work of Lewin [29], and is heavily inflected by Scandinavian design traditions [30]. Similar to PR, technological design projects that adopt a PD focus are strongly aware of the politics of research, and add to the PR concerns an equivalent awareness of the politics of technology and the politics of design. The PD directive to intimately understand users highlights the efforts by advocates of PD to negate or, at minimum, to circumvent the traditional power blindness of former system or community development approaches. While both PR and PD share a concern about the nature, scope, and breadth of participation within research or design projects, and while both approaches promote innovation through the development of contextually-specific methods, tools and techniques, PD is perhaps more aware of the political nature of the activities that occur in PD projects. This is due to the added layer of technological development and design expectations that PD projects make visible. Both PR and PD could be argued to be part of a tradition of action research in which understanding the field is "a problematic practice of coming to know through struggle" [31, p. 3].

For interaction design research with adolescents, the philosophy, concerns, principles and methods of PD/PR are a natural fit. Yet involving adolescents in PD/PR can be challenging. In terms of designing a study approach and creating data collection instruments, traditional consultative methods of interviews and focus groups may be ineffective with adolescents. The use of these methods may provide underwhelming results, as adolescents tend to silence themselves in groups [11,32], avoid questions, and feel generally uncomfortable about being directly asked by adults for their input and ideas [11,33,34]. Furthermore, the sites in which this data is collected are often spaces controlled by adults, such as conference rooms or health clinics. Even within home settings, researchers have remarked on space-related challenges to data collection such as interruption or eavesdropping by other family members, which can contribute to an atmosphere encouraging reticence and silence [11].

Because of this challenge, care must be taken in the choice of venue, the tool used to gather data, and the ways in which results will be made public. More than with any other population, adolescents are sensitive to the maintenance of face and the impressions given to others, particularly those of their peers [26]. Thus, researchers and designers must come to an understanding of the influences of peer groups. This requirement means that peer sensitivity must be a driving force in the choices made around environment, tool and publication.

It is for these reasons that we find encouraging the current turn towards ecological inquiry [36] in PD/PR informed interaction design for adolescents and children. Adapting the ecology term from biology, where it describes the ecosystem, actors and forces that interact in a specific bounded area, the ecology term is ported into user environment work done through PD/PR lenses. Our understanding of ecological inquiry is heavily influenced by Crabtree and Rodden's concept of hybrid user ecologies, described as "the space or environment that cooperation takes place within and to the socially organized ways in which the environment affords collaboration" [37, p. 481] and by Nardi and O'Day's [38] concepts of information ecologies, which elevates digital tools and informational flows into the role of important ecological actors. Each of these paradigms has informed three guiding maxims for videographic requirements gathering method: (1) enact positive change; (2) know thy user as a human; and (3) keep it real.

Maxim #1: Enact positive change. Following from participatory and action research paradigms, we see the designer as a 'change agent' who should simultaneously and collaboratively increase knowledge and trigger positive social change [1,2,9]. We thereby pose a maxim going beyond the traditional ethical alignment of researchers and design practitioners that says, 'do no harm'. Instead, we shift the register up to advocate 'ensure that we enact positive change'.

Maxim #2: Know thy users as humans. Adolescents—not adult interaction designers—are the experts of adolescent lives. Thus we advocate an activist-focused philosophy that calls for the development, empowerment and promotion of participants who might be impacted by the activities and developments within a project's scope [22]. We believe that technological interventions should transform the ideological and material conditions of a given population, based on the democratization and deep adaptation of technological research and development to underserved human populations [11]. We adopt two transformative sensibilities in approach and philosophy. Within interaction design projects, then, the first transformation must be in the treatment and interactions with our research populations, moving from hands-off protected and contained informant, to collaborative and invested partner. The second sensitizing directive for us means that we must work with our participants as collaborators, following behind them as guides and helping them leverage their situated knowledge of their own personal ecologies by transforming their experience into designs we create collaboratively with them.

Maxim #3: Keep it real. Value-sensitive design advocates an attention to the positive human values that can be enabled and extended through technological design [6,8], and it requires design researchers to "broaden the goals and criteria for judging the quality of technological systems to include those that advance human values" [6].

Recent value-sensitive design [4,12,13,27] literature argues that the needs of users are to be studied in situ, and designed artifacts must be grounded in the specificity of the real lives of actual users. From this, we synthesize the maxim to 'Keep it real.' This means we advocate for getting out of the lab or studio and into the streets, in order to understand their reality and the values that their lived experiences bring to the design process.

4 Videographic Requirements Gathering

When gathering requirements for the design of technologies for adolescents, there can be challenges resulting from adolescents' high sensitivity to social situations, identity management, and gatekeeping. However, these tensions are not insurmountable barriers. In the following sections, we present a method for conducting formative requirements gathering in interaction design that provides a balance between these tensions. We refer to this method as *videographic requirements gathering* (VRG). Drawing inspiration from the cooperative inquiry approach to PD/PR advocated by Yip et al. [39], the participant authored audiovisual story approach from Ramella and Olmos [40], and informed by the visual ethnography work of Pink [41], our VRG method is intended to provide a direct window into the everyday lives of adolescents in situ, in a way that is both engaging and respectful of participant preferences. It adopts the concepts of participatory partnership from PD/PR and transposes design activities with adolescents into a maker culture context, through construction of creative artifacts to be shared.

In videographic requirements gathering, participants share information about their life's challenges and daily routines to the research team through creation of a "reality TV" show of their lives. A familiar format to adolescents around the world in shows such as *Swayamvar* (India), *Factory Girl* (Korea), *Celebrity Big Brother* (UK/Netherlands) and *The Real World* (USA), television reality programs depict the struggles and triumphs of youth and twenty-something in a variety of life situations. A common aspect of the reality show format is the creation of 'highlight reels' of daily events, video diaries, photographs, music mashups and other out-takes of daily life. Adopting a reality television show approach empowers adolescents to directly show and tell researchers what is important in adolescent life, while at the same time keeping control over their identities.

4.1 Method

The method is iterative and overlapping, requiring multiple interactions with adolescent participants. The amount of time VRG takes can be adapted to the needs of the researcher and setting, keeping in mind that the longer the data collection period, the greater the risk of participant attrition. We estimate that 2-3 weeks is sufficient time to capture rich data without excessive participant dropout. To ensure participant retention and to ease recruitment, some contexts where the method may work well is in a summer camp, youth organization, or an after school program. Participants could also be interns or employees of an organization. In total, we would recommend

including a maximum of 12 participants per VRG group; this is done to ease facilitation of full-group meetings. Again, depending on the needs of those collecting the data, this number can be increased or decreased to meet local conditions.

Once a context of use has been identified and participants have been selected, the making of the reality show starts out with a briefing, in which participants learn more about the project goals and their role in the production process. This initial briefing can be done on either an individual basis or as a group event.

During the data collection period, the adolescents are sent into their regular daily world and asked via prompts to report back via video, audio, and text capture on what is happening to them, why that is relevant to the project, how they feel about it, and what they would do with that knowledge when designing a new digital artifact. Prompts for eliciting feedback can either be collaboratively created during the initial briefing, or provided by the researchers. The prompts can be delivered in a number of formats, including but not limited to survey questions or cultural probes [42,43,44,45]. Whatever the format, we recommend that the prompts should explain not only what the researchers would like to see but also why it's important to know about that aspect of adolescent life.

In addition to the prompts, at the end of each data collection day, participants complete an activity echoing the video reflection diaries of reality television. In this activity, adolescents are asked to record themselves reflecting on what happened that day relative to the question of interest and to the project, and how they feel their mobile phones might play a part in the aspects of their lives under study, be it health, education, family management or other social issue.

An optional activity during this data collection period is to also use asynchronous or synchronous media creation and sharing tools (e.g. group chat, photo sharing) to connect all participants over a distance, and to facilitate early-stage sharing of content and discussion of technology design features, which can be facilitated by peer or adult facilitators.

These exercises operationalize a perspectivity meme to the project. A meme is a viral idea, and the perspectivity meme is taken from Goldman [46], who says that it is "the idea that people who share their viewpoints and interpretations will gradually affect role changes...They will not only 'see' each other's points of view, but also share roles and viewpoints." The reflexivity that would be stimulated by the perspectivivity meme would be intended to get adolescent participants thinking about design features.

When the initial period of data gathering and design reflection is over, participants would come together face to face in what we term a "*creative jam*." During this event, participants can divide into teams with a peer or adult facilitator and design low fidelity prototypes, drawing on the life issues and contexts identified in videos, photos, texts, messages, or chats. While the goal would be more to design and make an app come to life, rather than compete against others for a prize for 'best app', design professionals and community stakeholders could be involved some or all of the prototyping process.

After the creative jam, teams could then have the opportunity to work together with researchers and stakeholders to get the app developed, or if the youth have the skills or can be mentored into the skills, to develop the app themselves. The end result is a concrete artifact, based on understandings from the ecological inquiry gathered through videography, diaries, and jam activities.

In Figure 1, we show the process informing our own work with adolescents who have chronic health conditions. The process involves four phases for the flow of videographic requirements gathering. The first phase, capture, trains adolescents in the use of tools for data capture. The second phase, context, involves having adolescents self-interpret and assemble their "reality show" clips into an episode. The third phase bonding, involves group bonding, in which the adolescents present their reality shows to peers. Using the shows and the mood boards created by the design teams, the adolescents co-develop a list of shared preferences, life issues and challenges, and possible app ideas. They then participate in the app jam to develop rough-cut prototypes. Finally, in the sharing phase, reality TV content created by the adolescent populations is used to facilitate discussions with adult stakeholders, as well as other adolescents who may participate in later parts of system design and testing. The phased approach we suggest herein is just one way in which the videographic requirements gathering process can be operationalized; we encourage researchers to adapt the method as is appropriate to the research context and need.

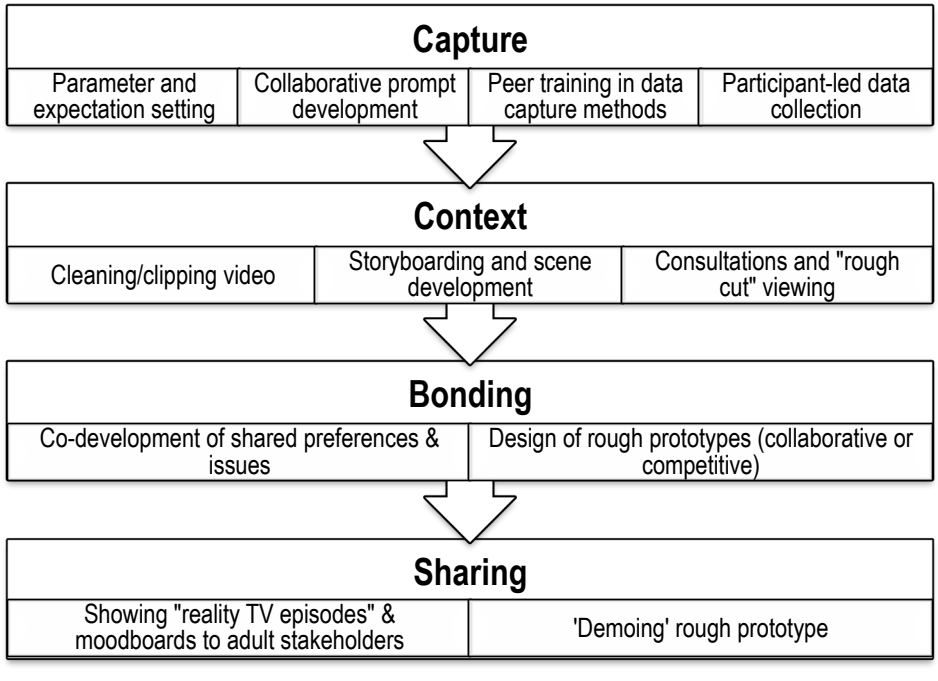

Fig. 1. An example of how VRG can be operationalized

4.2 Data Capture Tools

We recommend use of mobile phones as data capture tools, as well as video editing devices. This is recommended not only because of low cost and ability to easily capture audio-visual content, but also because mobile phones are a crucial part of adolescent life [23,24,47,48]; video and texting practices are cited frequently as the

preferred method of communication for adolescents [49]. Asking adolescents to use mobile devices to gather data about their lives in a reality show montage takes a familiar media genre, a comfortable capturing medium, and directs it towards adolescent-led research in a way that adolescents find recognizable and appealing [33,35].

4.3 How VRG Fits into the Interaction Design Process

Drawing from the ecological turn, videographic requirements gathering (VRG) provides a window into the world of adolescent life, grounded and situated in their everyday contexts as interpreted by them. By either replacing or augmenting traditional interviews and focus groups, this technique can highlight the difference between what adults think they want to know, and what adolescents are actually doing in their lives. In other words, videographic requirements gathering can be a powerful reality check and design motivator. For example, videographic requirements gathering can showcase the key concerns and stressors in adolescent lives. For example, do the videos make obvious the fact that the relevant population appears caught up in college and career planning? If so, then planning for technology interventions without being aware of this upcoming major transition would be inadvisable. Alternatively, are their data reflective of entertainment away from the home or being on the go? If so, this may suggest avoiding technology design decisions that involve being tied to a computer desktop or even a laptop.

In addition, videographic requirement gathering can provide insight into specific aspects of UI design. Recently, a popular approach to technological interventions with adolescents has been gamifying mobile apps or websites. Yet if the data show little influence of games or gaming as an activity, or even if they show the ways in which games are part of their life, these understandings can lead to better decisions around how to make intervention systems, technological interactions or applications more engaging, or conversely, can lead to a set of design choices that do not adopt gamification. Similarly, rather than automatically making apps pink and sparkly because they are going to be targeted at girls, finding out what sort of colors and imagery female adolescents have in their lived environments and fashion can aid in making stronger decisions on graphical user interfaces. Finally, finding out the level of peer sensitivity and peer influence on an individual teen within a target population can aid in making design decisions around whether and how to incorporate social media, direct interactions among adolescents through chat or forum paradigms, and what sort of levels of privacy the adolescents themselves expect in a system.

5 Opportunities and Challenges for VRG

While videographic requirements gathering may appear to be a heavyweight approach, keep in mind that this technique elides power barriers of privilege [12] through the use of familiar techniques and tools that exist as part of daily situations, environments, and practices. This avoids the creation of data gathering ‘contact zones’, which are “social spaces where separate cultures meet, clash, and grapple with

each other, often in highly asymmetrical relations of domination and subordination" [50, p. 4]. In participatory design research, such contact zones are often labs, clinics or conference rooms; spaces that are owned and determined by adults, reinforcing asymmetrical power relations. Through videography, moving the scenario of data gathering out into the participants' daily living environments recalibrates the power relations back a participant subjectivity that is in keeping with participatory design considerations for the politics of research [26,27,51].

We also note that data collected via videographic requirements gathering can sometimes also have a dual-purpose use as promotional material for engaging relevant interest groups (parents, educators, clinicians, community leaders, potential sponsors) by helping them to better understand the lives of their teen populations. In this way, the collected data can calibrate discussions of the project's future activities, potential impacts and technological intervention areas.

At the same time, those wishing to adopt videographic requirements gathering must be attuned to the potential participatory, organizational, ethical, legal and sociocultural barriers to interaction design with adolescents in real-world settings. While many of the challenges of videographic requirements gathering are not new—they have been seen repeatedly in ethnographic research. It is, in a sense, a newer version of the old messy issue of getting into and out of the field [52].

However, audiovisual capture with adolescents adds new challenges. Although adolescents may already be capturing audiovisual accounts of their everyday lives as part of their typical daily routine, turning that existing practice into a research practice may raise both real and inflated concerns among ethical oversight boards at universities, with legal managers within corporations, and to other gatekeeping boards (e.g. school boards, clinical ethics boards). Key stakeholders may have concerns about their liability for what adolescents record. Potentially due to legal risk judgments, there may be requirements to do large amounts of gatekeeping and data policing. Audiovisual methods may be more highly scrutinized and actively monitored than other techniques, such as focus groups, where the person doing data collection more tightly controls the setting and discussion. Certain settings might be deemed by stakeholders to be off limits to recording, such as those of schools or health clinics, even though participants might have already done extensive audio video capture in those environments as part of their own daily habit or hobby practice. Ultimately, we recommend becoming familiar with local laws on consent and recording, and train participants in best practices for partaking in data capture. In addition, design teams should have pre-established procedures and reporting requirements if abuse or illegal activity is recorded.

6 Conclusions

The videographic requirements gathering method that can provide a set of evidence of everyday lives and concerns of target adolescent populations, which, in turn, feeds into design decisions around technological artifacts. It can also provide conversational handles to use with adolescents in later participatory design sessions. The method maximizes approaches to data gathering that make sense to the target audience. By using approaches they already know, the time required to train adolescents in the

technical process of data gathering is minimized. Having access to a direct capture of adolescent concerns and everyday scenarios can result in technology geared at older adolescents that is more evocative and compelling. More importantly, the power disparity between designer and subject is fundamentally altered. The end result should be a set of understandings about lived adolescent realities that can directly feed into subsequent prototyping and designing of technological artifacts, thus providing a contextualized sense of ecological validity that would not be as readily apparent through other data gathering methods.

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