

# Usability Professionals' Personal Interest in Basic HCI theory

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**Abstract:** This paper proposes a way to identify professional knowledge in a heterogeneous HCI (Human-Computer Interaction) community of usability professionals, designers and researchers. The purpose of the paper is to help recognize different kinds of HCI professionals. The suggested framework relates individual experience, education and expertise to situational (short term) and personal (long term) interest in HCI theory. Interest in theory including educational and organizational background factors have been investigated in an online survey of 120 members of a Danish HCI community. An exploratory, multivariate analysis of the survey data identified relations between background factors and personal interest in HCI theory. In the conclusion, I present the two different kinds of professional knowledge identified in the survey and describe implications for HCI education and development of professional usability knowledge.

**Keywords:** Personal interest, HCI theory, professional usability, online survey, exploratory analysis.

## 1 Introduction

Any profession that requires academic training is faced with having to identify the professional knowledge of the field. In HCI, it has recently become important to demonstrate to employers how professional knowledge within the area of usability is a key advantage.

There are, however, no measures for professionalism in the usability area. Therefore, formal certification has been suggested as a way to distinguish amateurs from professionals (Day & Bevan, 2002). Under the proposed scheme, evaluation of credentials might include techniques such as the professional's description of how and why usability principles were used in a project, examination of his or her problem solving style and an assessment of the professional through an interview with an expert. To raise the quality of professional usability work, it seems necessary to ensure that professionals have a certain level of experience with application of usability principles in practice.

Apart from having the relevant experience, usability professionals may argue that their basic training provides them with the relevant knowledge. A part of the original agenda of HCI was a view of

the field as a science based discipline (Card, Moran & Newell, 1983). However, in HCI as elsewhere graduates experience a "reality shock" when they attempt to apply their theoretical knowledge in their first job as a professional. Such an experience may lead to changed attitudes and an ambivalent reaction to theoretical knowledge (Bromme & Tillema, 1995). It has never been clear whether practitioners need (a) an academic training (education at university level, i.e. a master's degree) and (b) whether the training should include some kind of HCI curriculum. Many experienced consultants find it difficult to apply theory in its current form in practice and tend to rely on experience and intuition in interpreting their results. They find that they really do not need to use theory (Rogers, 2001). The field is, moreover, driven by inventions, and there are only two or three studies of each new invention (Whittaker, Terveen & Nardi, 2000). In principle, the structure and purpose of theory are not suited for analysis and to report findings of practical studies (Bromme & Tillema, 1995). Thus, reports from usability studies have their own audience and purpose (Bevan, 1999).

Despite these arguments in favour of "know-how" and against the direct use of basic theoretical knowledge in HCI practice, it is reasonable to believe that professionals are interested in particular

theories. In other professions, it has been demonstrated that theory and theoretical frameworks have important communication, orientation and “identity” functions (Bromme & Tillema, 1995). Thus, basic education and other formal training settings provide the individual with a language, analytic skills and an identity as a basis for further professional development.

In this paper, I will begin by discussing personal interest as an affective variable in understanding professional knowledge. Then, I will present the method applied in and the results from a questionnaire study of a Scandinavian HCI community. The paper concludes by discussing how to identify professional HCI knowledge and by suggesting possible implications for practice and for basic HCI education.

## 2 Personal interest in theory

Interest is an affective variable borrowed from educational psychology research. It has been discovered that interest has a profound facilitative effect on cognitive functioning and outcomes of learning, especially a high degree of deep-level learning (Krapp, 2002). The relation between interest and learning a topic is very important, especially in terms of life-long learning and development of professional knowledge.

In the framework adapted from educational psychology research (see Krapp, 2002), personal, individual and long-lasting interest grows from situational, short-term interest in a topic. This development is related to a person’s development of a professional identity. Interest is regarded as a specific person-object relationship. It is the affective component of a person’s relations to specific objects in the environment. Within all the possible relations between persons and objects, a person will only develop a closer relationship to a few objects or object areas for longer periods of time. An object of interest may refer to a concrete thing, a topic or an abstract idea in a person’s life-space. However, in knowledge work, the epistemic interest - the affection for theoretical objects or areas - plays a central role. Epistemic interests induce a person to acquire new knowledge and competencies related to the area of interest. Epistemic interest is part of a person’s network of knowledge. It is individualistic, but not completely idiosyncratic because it is rather standardized through the contents, activities and events in education and professional training. It is possible to distinguish between an interest in the content of an area (pure epistemic interest), interest

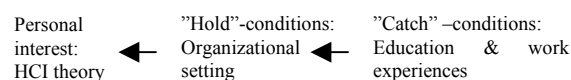
in the whole area as such, and interest in the way to do things within an area.

From a cognitive viewpoint, interest is related to feelings and values. Values originate from the experienced relevance of and degree of identification with the object of interest. Feelings refer to positive emotional states experienced while engaged in the interest-based activity. Hence, interest-based interactions with the environment are characterized by optimal modes that combine cognitive qualities (e.g. thoughts on meaningful goals) and positive, affective qualities (e.g. well being, joyful excitement) (Krapp, 2002).

Thus, we may expect HCI professionals to be interested in specific theories. They may include theories of specific phenomena (e.g. ecological interfaces), broad theoretical frameworks (e.g. contextual design) or be more methodological in nature (e.g. ethnography). The professional’s interest in HCI theory is a stable basis for thinking and acting in a positive mode towards new kinds of usability issues.

### 2.1 Levels of analysis

Interest is usually analysed on two levels (Krapp, 2002). On the first level, interest refers to the dispositional or habitual structure of the individual. Here, interest is interpreted as a relatively stable tendency to engage in an object of interest. This is individual or personal interest. On the second level, interest refers to current engagements and describes a state or an ongoing process during an actual learning activity, i.e. being interested in something during learning. This involves focused attention, increased cognitive functioning, persistence and affective involvement. Provided it is primarily evoked by external factors, such a “working interest” is called situational interest.



**Figure 1:** Development of personal interest in HCI theory. Adapted from Krapp (2002).

**10a. Your interest in and work with theory.**  
 In recent years an increasing number of HCI relevant theories and frameworks have been developed. It is unclear to what degree these have been adopted in practice. In the following we list a number of these theories and ask you to indicate your interest in each on a scale from 1 to 4. Furthermore, we ask you to mark - if necessary with several marks per row - how you have worked with the theories. Bear in mind how it have been during the past year.

	1=No interest, 2=Little interest, 3=Some interest, 4=High interest. If you don't know off the theory, indicate this with "0".	Read book, article, etc.	Attended meetings, conferences, etc.	Participated in workshops, courses.	Used in own investigations, analyses, etc.	Written about, taught others, etc.
Contextual design		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication theory		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 2:** The layout of a combined Likert scale and multiple-choice question .

Developing a specific interest in theory can be described as a process in which situational interest is stabilized and finally becomes a long-lasting personal interest. We may look at situational interest in two different ways. The first time situational interest is awakened or triggered by external stimuli is the “catch” situation. To “hold” the interest, it should be stabilized over a period of time, e.g. by participating in a work project in one’s organisation. Both “catch” and “hold” situations of interest are necessary to develop a personal long-term interest in a topic. It is reasonable to assume that without being in a “hold” situation, the personal interest will weaken or become less prominent. Development of pure interest happens seldom as it requires identification with the goals, actions and topics related to the interest (Krapp, 2002). Therefore, an individual with a developed professional interest will prefer to continue developing his or her specific knowledge of the topic of interest.

Therefore, the analysis of interest in HCI theory implies an analysis of interest in specific HCI theories (pure interest), current organisational settings (factors that “hold” situational interest) and education and working experience (factors that allow “catching” new interests), see figure 1. In the rest of the paper, I will discuss whether it is possible to identify professional knowledge empirically and distinguish between different usability specialists on the basis of this model.

### 3 A survey of Sigchi.dk members’ interest in HCI theory

To study the personal interest in theory among different usability professionals, I made a survey of members of a Danish HCI community, Sigchi.dk,

which is a prospective local chapter of ACM SIGCHI. It has grown tremendously in numbers since it started in Denmark in 1999. Due to the many newcomers in the community, the identity of the usability profession is not very stable, and there is no good approach to identify professional knowledge in such a community. For example, to apply a certification approach without considering some measures relating to the many young professionals’ future performance seems unreasonably conservative under the circumstances.

#### 3.1 Method

The survey was performed as an online web based questionnaire. The online form was used instead of a paper-based form (although you may expect only half as many responses), because respondents will answer complex questionnaires more completely online than off line (Klassen & Jacobs, 2001). The questionnaire consisted of a Likert scale, multiple choices and open questions. The questions were divided into five groups. After briefly presenting the purpose of the survey, the respondents were asked about personal, demographic information: education, job position and employment. The participants had the opportunity to be anonymous in two ways: either by leaving out personal information or by using a special email service that allowed me to contact them individually without knowing their real identity. The respondents were asked to describe and prioritize their job areas and to label and prioritize their professional and personal network. Next, respondents were asked to assess their interest in theory (see figure 2). The theories and frameworks presented to the respondents had been chosen on the basis of (a) a recent review of HCI theories (Rogers, 2001) and (b) my own analysis of HCI courses offered in institutions of higher education in

Denmark. In an open question, the respondents had the opportunity to explain their assessments. Finally, the last questions were related to the deliverables of the usability work: who were the purchasers and what were the products. In total, the questionnaire included 19 questions with 96 attributes. The open questions varied from purely factual questions (e.g. year), semi-open questions (stating categories and prioritizing among them) to free text questions requiring some reflection.

Four experienced usability professionals, who conformed to four very different specialist profiles we earlier had found (Clemmensen & Holck, 2001), tested the questionnaire. They suggested certain improvements in the conceptual design of the questionnaire, how to implement it in html code, technical fault recovery, detailed improvement in formulation of questions and how to use standard services for online questionnaires. The revised version of the questionnaire was made available to all members of Sigchi.dk. I chose to distribute the link to the questionnaire through the community's official newsletter, because the following issues were essential to the response rate: (a) the total number of personal contacts, (b) how personal the contacts were and (c) how many contacts were made before a renewed request for response was mailed (Cook, Heath & Thompson, 2000). After one week, another newsletter was sent asking again for participation. After two weeks, a third message was mailed. This time, short questions about the reasons for non-participation had been added.

At the time of distribution, the target community consisted of 612 members (students were not allowed in the survey). During the first of the three weeks that the questionnaire was online, I received 62 responses. During the second week, I received 52 responses and in the third week 8 responses. In total, I received 124 responses. In my opinion, four of the responses were from full time students. These responses were discarded leaving me with 120 respondents (20%). This response rate is satisfactory as (a) only a http-link was mailed to the population and not the questionnaire itself, (b) a low response rate is acceptable in Information Systems research: (Henriksen, 2002) found six IS studies published recently in international scientific journals with response rates between 10 and 28 percent, and (c) I asked non-respondents to indicate why they did not want to participate in the study and learned that a few members did not understand or did not accept the description of HCI in the questionnaire. One non-respondent commented e.g.: "I feel that the questionnaire reflects a distortion of HCI in the sense that it becomes either a psychological or a

visual discipline". Another common reason for declining to participate was lack of time to get involved in any study that did not apply to business.

Furthermore, the response representativeness in questionnaire surveys is more important than the response rate; the response rate is actually only important if it influences the representativeness (Cook, Heath & Thompson, 2000). On the whole, the members responding matched the Sigchi.dk community, i.e. their distribution on education (at least a master's degree: Sigchi.dk 73%, survey 82%), gender (women: Sigchi.dk 39%, survey 38%) and employment (private companies: Sigchi.dk 65%, survey 74%) did not differ significantly (chi-square test:  $p > 0.05$ ) from the distribution of all the Sigchi.dk members. In addition, the large share of privately employed professionals in both the target group and the response group indicates that the share of researchers in the response group was representative. It was not particularly members with a professional interest in theory who responded – in fact, it turned out that only 18 out of the 120 respondents were full time researchers and only seven others were involved in research in part of their working hours. Compared to the demographic criteria, the survey response was representative for the whole Sigchi.dk community.

The respondents apparently trusted the online questionnaire and were interested in elaborating on their answers: More than half of the respondents (60%, 71, N=120) chose to be non-anonymous and more than half (61%, 73) were positive about a follow-up interview. The share of the respondents who answered the questions was constant, i.e. between 90 and 103 assessed their interest in each of the 13 theories. 82 answered all parts of the question about theory. The respondents' interest did not seem to drop at the end of the questionnaire. The expectation that an online questionnaire would be helpful in getting answers to a complex questionnaire was fulfilled.

### 3.2 Analysis

The purpose of the questionnaire was to investigate the interest in HCI theory among Sigchi.dk community members. On a general level, the goal was to explore the hypothesis that interest was related to organisational factors, educational background and work experience. It was not a hypothesis in a strict sense and the aim was more focused on understanding the relations between the categories in the survey than on establishing causal relations. Therefore, I chose to analyse the respondents' ratings of interest and information of a factual nature statistically by means of a block

Interest in theory ←	Hold factors ←	Catch factors	
Contextual design (A) Communication theory (B) Activity theory (C) Situating action (D) Ethnomethodology (E) Information processing (F) Cognitive modelling (G) Ecological design (H) Interactive cognition (I) Distributed cognition (J) Participatory design (K) Visual communication (L) Theory of emotions (M)	Job title (N) HCI work products (Q) Research & Development (R&D) activities (S) Use of theory (P)  Organisation's products (R) Purchaser of HCI work (O)	HCI course (V) HCI thesis (W) HCI work experience (X)  Educational level (U) Educational faculty (T) ..... <i>Other general factors:</i> Age (Z) Sex (Y)	Primary Problems   Secondary Problems

**Table 1:** Factors in the development of a personal interest in HCI theories. Note: Primary problems include issues that are theoretically relevant to the development of interest; secondary problems are other factors that need to be considered.

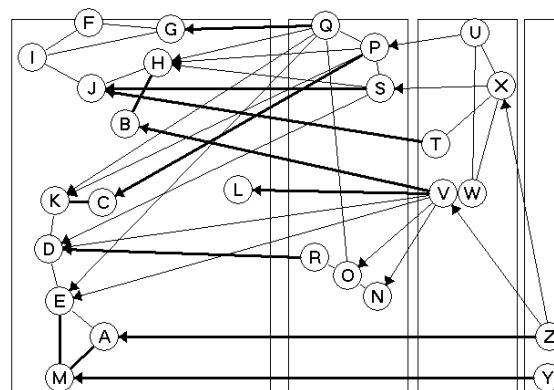
recursive graphical model see (Kreiner, 1986). This means that I placed the variables from the questionnaire in a series of recursive blocks (based on the model in figure 1) where all influences between variables in different blocks are assumed to work in one direction only. Also, I placed the general control factors of age and sex in a separate block, producing four blocks as shown in table 1 below. In addition, I divided the variables into problems of primary and secondary importance to screen the causal model with a focus on theoretically relevant relations between variables.

An important feature of this exploratory screening method is that it allows us to analyze high-dimensional contingency tables with few subjects by chain graph models, exact conditional tests for conditional independence, analyses of ordinal categorical data and independence graphs. The main reason for using this multivariate analysis was the obvious risk of spurious relations in the survey data, if the analysis had been restricted to a two-way analysis of variables. Hence, reported correlations are partial correlations, i.e. correlations conditioned by the relevant control variables. It also made no sense to treat the data as interval data because of the subjective nature of the respondents' answers to affective questions. The analysis was performed with SCD/Digram © software version 0.1. developed by Kreiner (1986).

## 4 Results

All the usability professionals who participated in the survey had at least a weak interest in one or more theories (100%, 101, N=101, 19 missing).

Most respondents showed an interest in more than one theory. On the average, they were interested in 7-8 different theories (percentiles 25%: 5; 50%: 8, 75%: 10; median 8, average 7, std. dev. 3). A few respondents (7) showed an interest in all 13 theories; half of these (4) were full time researchers at universities or research institutions. However, most respondents assessed one or two theories to be highly interesting (75% 76, median 2, std. dev. 2), i.e. a typical usability professional seems to have one or two "favourite" theories.



**Figure 3:** The relations between theories of interest (left column), "hold" factors (central column), "catch" factors (third column) and general factors (age and sex). See table 1 for explanation of symbols.

Table 1 shows the variables from the survey: the HCI theories, current organisational settings (factors that "hold" situational interest), education and working experience (factors that "catch" new interests). Figure 3 shows the results of the analysis

of the relations between the variables shown in table 1. The thick lines indicate significant associations that are explained in the tables below. The thin lines illustrate relevant control variables found by the analysis.

#### 4.1 “Hold” factors

Some of the 13 HCI theories in the survey were of interest due to situational factors alone. Thus, the current organisational settings of the usability specialists influenced their interest in cognitive modelling, distributed cognition, activity theory and situated action theory (illustrated by the thick lines from the central to the left column in figure 3).

Organisational products (R)	Situated action theory (D)	
	No interest	Weak, some or high
Design, instruments and dedicated software	–	36 (100)
Consultant reports and other products	5 (45)	6 (55)
Total	5	42

**Table 2:** The organisation as a “hold” factor for interest in situated action. N=47, gamma = -0.48, p=0.002. Numbers in parentheses are the row %.

The interest in situated action theory was influenced by the products of the usability professional’s current organisation (see table 2). However, the graphical model in figure 3 shows that the ‘situational’ interest exists within a context of interests in a group of related theories (A,C,D,E,K,M), which I will characterize as ‘broad theoretical frameworks’.

Some interest in participatory design (K) & Use of theory(P)	Activity theory (C)			
	No interest	Weak	Some	High
Used theory	2 (22)	4 (44)	7 (33)	-
Did not use	2 (2)	4 (25)	3 (44)	3 (19)
Total	4	8	10	3

**Table 3.** The use of theory in their own work as a negative “hold” factor for usability professionals’ interest in Activity theory. N=25, gamma = 0.50, p = 0.041. Numbers in parentheses are the row %.

Apparently, usability professionals’ interest in situated action theory created by the type of

organisation in which they work supports their personal interests in similar HCI theories. The importance of being interested in related theories was so strong that even usability specialists who were not currently engaged in research (S) or had participated in a HCI (V) course, but were interested in related theories (K,E), actually had some interest in situated action (N=4, gamma= -1.0, p=0.000).

The context of other theories is also visible in a group of usability specialists with some, but not a high, interest in Participatory Design (K). Their interest in activity theory (C) was low, if they had actually used theories in their own work (P), see table 3.

HCI products (Q)	Cognitive modelling (G)			
	No interest	Weak	Some	High
Sketches	5 (71)	2 (29)	-	-
Instruments and websites	3 (21)	4 (29)	5 (36)	2 (14)
Reports, teaching	5 (12)	13 (32)	16 (39)	7 (17)
Total	13	19	21	9

**Table 4:** The products of HCI work as a “hold” factor for interest in cognitive modelling. N=62, gamma = 0.46, p = 0.006. Numbers in parentheses are the row %.

Usability professionals’ interest in theory was also influenced by other situational factors apart from organizational products. The type of products that the HCI work produced was also a source of interest in particular HCI theories, as indicated in table 4. In table 4, it is obvious that all professionals involved in design sketches have no or only a weak interest in the cognitive modelling theory. However, the theory is of some or high interest to many professionals who develop instruments, design web sites or write analytical reports.

Usability specialists who are interested in cognitive modelling also tend to be interested in information processing, interactive cognition and distributed action. The interest in a group (B,F,G,H,I,J) of related theories, which I will characterize as “theoretical models”, is influenced by the “hold” factors: HCI work products (Q) and R&D activities (S), see also the graph in figure 3.

## 4.2 “Catch” factors

The “catch” factor is a condition that may cause an early interest in specific, epistemic objects. In the model in figure 3, interest in distributed cognition is related to educational faculty. Table 5 shows that this interest is especially high among usability specialists with a background in the humanities and social sciences.

Educational faculty (T)	Distributed cognition (J)			
	No interest	Weak	Some	High
Natural science	4(57)	1(14)	2(29)	-
Technical science	2(50)	-	2(50)	-
Humanities	6(24)	9(36)	5(20)	5(20)
Social science	-	4(67)	1(17)	1(17)
Total	12	14	10	6

**Table 5:** Educational faculty as a "catch" factor for interest in distributed cognition. N=42, gamma = 0.31, p = 0.038. Numbers in parentheses are the row %.

Participation in a HCI course during the usability professional’s basic education is another possible “catch” factor. Tables 6 and 7 show that participation in a HCI course is related to interest in communication theory and visual communication.

Apart from “hold” and “catch” factors, age (Z) and sex (Y) also influence the interest in HCI theory. Young respondents were the group most interested in contextual design. Male usability specialists showed the highest interest in a theory of emotions, but only those who also had an interest in ethnomethodology (E) and contextual design (A).

Interest (weak) in ecological design & HCI course (W)	Communication theory (B)			
	No interest	Weak	Some	High
HCI course	-	2(33)	1(17)	3(50)
No course	2(29)	1(14)	4(57)	-
Total	2	3	5	3

**Table 6:** Taking a HCI course during basic education as a "catch" factor for interest in communication theory. N=13, gamma = -0.56, p = 0.041. Numbers in parentheses are the row %.

HCI course (W)	Visual communication (L)			
	No interest	Weak	Some	High
HCI course	3(7)	3(7)	14(33)	22(52)
No course	5(12)	8(19)	15(35)	15(35)
Total	8	11	29	37

**Table 7:** Taking a HCI course during basic education as a "catch" factor for interest in visual communication theory (L). N=84, gamma = -0.33, p = 0.026. Numbers in parentheses are the row %.

## 5 Discussion and conclusion

By studying usability professionals’ interest in HCI theory in a HCI community, I identified two areas of interest in professional knowledge: 1) interest in theoretical models of particular HCI phenomena and 2) interest in broad theoretical frameworks and methodological issues.

Epistemic interest, i.e. the affection for theoretical objects or theoretical areas, is an important part of a professional’s network of knowledge. If a usability professional’s network of knowledge includes epistemic interests in HCI, he or she will tend to acquire new knowledge and competencies within this area. Work based on an interest can be characterized by a combination of cognitive qualities and positive, affective modes such as job satisfaction. Together with other measures of professionalism such as certified competence, epistemic interest is an important feature of professional knowledge in a HCI community.

### 5.1 How to identify epistemic interests

According to the model applied, interest in different areas of professional knowledge can be distinguished by the associated conditions required to catch and hold such interest over a period of time.

To hold epistemic interest in a particular area of professional knowledge requires special conditions. In the HCI community that I studied, involvement in R&D activities and the production of analytical reports were both conditions associated with holding an interest in theoretical HCI models, while holding an interest in situated action and other framework theories was associated with working in organizations that produce design, instruments or dedicated software. However, experience from using a theory may not necessarily lead to an interest in any broad framework theory. Thus, usability

professionals with practical experience in using HCI theories were less interested in activity theory than usability professionals without practical experience in using theories. Having practical experience in using theory is no guarantee for maintaining an interest in a given theoretical HCI framework.

According to the model, the interest in HCI theory is often caught during basic education, when the usability professional to be for the first time meets the wonderful world of Human-Computer Interaction. HCI courses may provide the situations that inspire students to catch an epistemic interest in HCI, which they will maintain in their work as usability professionals. In the community I studied, interests in distributed cognition and communication theory were associated with a background in the humanities/social science and participation in HCI courses. Thus, basic education provided the opportunity to catch an interest in theoretical models, principles, etc.

Catching an interest in broad theoretical HCI frameworks may require other conditions than those found at institutions for basic education. In the HCI community studied, educational factors were not significantly associated with a personal interest in broad theoretical frameworks. However, young professionals, in particular those who had taken a course in HCI, were most interested in broad framework theories such as situated action, ethnomethodology and contextual design. This association indicates that the interest in broad frameworks must be explained by other factors in addition to the situational “catch” and “hold” factors proposed in the model applied.

## 5.2 Possible implications

Does it matter? Does a personal interest in HCI theory enable a practitioner to do a better job? Judging from the results of this empirical study of a HCI community, the answer is a conditional ‘yes’.

A possible implication for the development of professional usability knowledge is a clear need for several kinds of theories within the HCI community. The existence of different kinds of professional knowledge suggests that there will continue to be different views on methods and techniques used in the community. In terms of basic HCI education, the possible implication is that we need to work more deliberately on “catching” the students’ interest in HCI theory, including frameworks for HCI. Some theories might be more helpful than others or at least more clearly anchored in factors in the usability

professional’s organisation setting and educational background. Perhaps we should pay more attention to these theories when we choose our curricula.

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