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Functional assessment of comfort employing technology scale (facets): A brief intake instrument to facilitate treatment planning and communication with patients

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Abstract

The Functional Assessment of Comfort Employing Technology Scale (FACETS) is introduced as an instrument that can be used with the general population to assess comfort utilizing different kinds of information technology (IT). In clinical settings, FACETS can inform individualized treatment planning, direct choice of media for communicating with each specific patient, and through improved communication, facilitate better treatment outcomes and higher satisfaction ratings. Scoring, interpretation, clinical application and implications of FACETS are described. FACETS was designed to be sensitive to numerous variables, including age, gender, and socio-economic status.

Keywords: Functional Assessment of Comfort Employing Technology Scale (FACETS); Treatment Planning; communication with patients; IT media

Introduction

To date, most of the research exploring acceptance and utilization of information technology (IT) has come from the IT sector [1-8]. The most widely applied model of acceptance and utilization of technology is the technology acceptance model (TAM, [9]). The TAM has been expanded as the TAM 2 [10,11]. Another popular model is the Unified Theory of Acceptance and Use of Technology (or UTAUT, [12,13]). The UTAUT has been extended to study acceptance and use of technology in a consumer context (UTAUT2, [13]).

A few instruments have also been designed to assess self-perceived IT proficiency within specific vocations, including education [14,15], corporate or administrative settings [16,17], and Marriage and Family Therapists [18]. However, there has not yet been an instrument designed for use with the general population.

In clinical settings, improved communication with patients has long been known to produce better health outcomes, and increased ratings of satisfaction by patients and providers of care [19-22]. There exists a need for an instrument that assesses the patient's level of comfort utilizing different kinds of IT, informing individualized treatment planning and directing choice of media for communicating with each specific patient, which in turn facilitates better treatment outcomes and higher satisfaction ratings. The Functional Assessment of Comfort Employing Technology Scale (FACETS) was developed specifically to meet those needs.

FACETS is introduced in this paper as a brief questionnaire that can be used in a variety of settings to assess the respondent's level of comfort employing commonplace current information technologies in specific functional areas, or domains. In clinical settings, as part of a structured intake evaluation FACETS provides information that can inform individualized treatment planning. Specifically, FACETS clarifies whether a patient is comfortable using information technology (IT) in each of four separate IT domains. Knowing whether and how an individual person utilizes IT clarifies what technologies are available to them as resources, and can direct choice of media for communicating with them. In clinical settings, this information can also improve treatment outcome. FACETS was designed to be sensitive to numerous variables, including age, gender, ethnicity, educational level, and socio-economic status.

FACETS: description, development, administration, and scoring guidelines

Description

FACETS is a 12-item questionnaire. The 12 test items represent 4 functional domains: Social, Home, E-commerce, and Travel. There are three test items in each of the four domains. Each question has 5 optional answers ranging from "Strongly Disagree" to "Strongly

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Agree" that characterize the respondent's comfort employing a specific type of technology.[1]

Development

FACETS was developed to be consistent with test structures used in previous, normed technology questionnaires that have robust reliability and validity. For example, although the subject material and specific test items used are different from FACETS, the Technology Proficiency Self-Assessment Questionnaire (or TPSA, [23]) uses a similar 5-point system for responding to items, with responses ranging from "Strongly Disagree" to "Strongly Agree."

The specific FACETS items were selected to be categorically consistent with items from previous technology questionnaires including the Technology Integration Self-Assessment [14], the Technology Skills Self-Assessment [15], the Technology Skills Self-Assessment Survey [17], the Technology Proficiency Self-Assessment Questionnaire (TPSA) [16,23], and the Comfort with Technology in MFT Self-Assessment [18]. However, FACETS does not use specific test items from any of the previous tests. FACETS is different from previous technology questionnaires in several ways:

a) FACETS assesses comfort using technology as opposed to self-perceived proficiency using technology. Although one previous test, the Comfort with Technology in MFT Self-Assessment [18] assesses comfort with technology, it is designed specifically for marriage and family therapists. FACETS is designed for the general population with the intention of broader application.

b) Unlike previous technology questionnaires, FACETS items are structured into four functional domains to provide specific information about comfort with specific categories of technology. Specific items within each domain were selected to be consistent within that domain.

c) FACETS is intended to provide information that can be used in a clinical context to inform treatment planning.

d) FACETS is designed to help determine which communication media are most accessible to the respondent, and in clinical settings, which are most effective for communications between health care providers and the patient, to facilitate improved treatment outcomes and higher ratings of satisfaction by patients and providers of care.

e) FACETS asks respondents to indicate whether they would like to become more comfortable using each type of technology. Respondent willingness to learn new IT media informs decisions about what IT might become available as clinical resources, as well as the likelihood of future adoption of specific IT for communication.

f) FACETS is designed for application as a brief, structured clinical intake instrument. Accordingly, the number of items on FACETS was limited to 12, to enable administration and scoring within five minutes.

Administration

FACETS can be given to the respondent as a paper test on a clipboard for self-administration, or read aloud to the respondent either in person or over the phone. If the respondent has a physical limitation, an informant may be employed to assist in administration. It takes one to three minutes to complete. The clinician can score the FACETS in under one minute.

Scoring Guidelines

The scoring for each of the 12 FACETS items is assigned as follows:

Response	Score
Strongly Disagree (SD)	0
Disagree (D)	1
Undecided (U)	2
Agree (A)	3
Strongly Agree (SA)	4

The scores for the three questions in each functional domain are added to produce a subtotal for that domain (Table 1).

Table 1 Scoring the FACETS Four Functional Domains

Social Domain Subtotal (Questions 1, 2, 3)
E-commerce Domain Subtotal (Questions 4, 5, 6)
Travel Domain Subtotal (Questions 7, 8, 9)
Home Domain Subtotal (Questions 10,11,12)
TOTAL FACETS SCORE

Each functional domain is scored on a continuous scale from 0-12. Higher scores suggest greater comfort employing the technologies in that domain (Table 2). FACETS domain subtotal scores differentiate with the following cut-points:

Table 2 FACETS Functional Domain Cut-points

Severe Technological Discomfort	0 – 3
Moderate Technological Discomfort	4 – 6
Moderate Technological Comfort	7 – 9
High Technological Comfort	10 – 12

The four domain subtotal scores are then added to produce an overall total score (Table 3). Based on the same method as the one used within each domain, total FACETS scores range on a continuous scale from 0–48, and differentiate with the following cut-points:

Table 3 Total FACETS Scores Cut-points

Severe Technological Discomfort	0 – 12
Moderate Technological Discomfort	13 – 24
Moderate Technological Comfort	25 – 36
High Technological Comfort	37 – 48

Each FACETS item is followed by the statement, "I would like to become more comfortable…" with two options for response, either "yes" or "no." Although no numeric score is assigned to these

[1]See Appendix 1: The Functional Assessment of Comfort Employing Technology Scale (FACETS). Reprinted with permission. Copyright 2017. The Functional Assessment of Comfort Employing Technology Scale (FACETS) is a copyrighted instrument of Charles M. Lepkowsky, Ph.D. All Rights Reserved.

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responses, the responses indicate respondent willingness to become more proficient using each technology accessed by FACETS.

Clinical relevance and implications of facets scores

The FACETS total score provides a global sense of the respondent's general comfort employing commonplace technologies, and the FACETS domain subtotal scores provide a functional assessment of the respondent's relationship with specific technologies in each of the 4 functional domains (Social, E-commerce, Travel, and Home). FACETS domain subtotal scores and total score can reduce provider bias by giving the health care provider a quantitative understanding of the respondent's functional relationship with specific technologies. Higher FACETS domain scores (indicating greater comfort) suggest specific technologies that might be utilized as resources for the respondent. The unscored responses for each item can be used clinically to determine whether the respondent desires training to increase comfort with each specific type of technology, which might become available to the respondent as additional resources. Expressed desire to become more comfortable with specific technologies can also inform health care systems about which media are likely to become useful in the future for communicating with and providing access to their subscribers or patients. If the respondent asks for assistance to increase their comfort employing technologies in domains where FACETS scores are low, occupational therapy or other resources can be mobilized. In either event, information becomes available that informs the development of a treatment plan.

For example, scores of 0 to 3 (Severe to Moderate Technological Discomfort) in the Social domain indicate limited comfort using email, text messaging, or use of social media. Use of the internet has been associated with less loneliness and lower levels of depression in older adults [24,25]. Conversely, limited comfort using the internet for email, social media, or text messaging are associated with higher levels of loneliness and depression. Among older adults, building greater comfort and facility with current technologies leads to increased feelings of efficacy and connectedness [26-28]. Older adults' use of the internet has also been associated with less loneliness and lower levels of depression [24,25,29-32].

FACETS scores can be used in integrated primary health care settings and collaborative care models to inform treatment planning decisions about what media can be used with older adults as treatment resources. This is especially relevant in the context of the high rate of comorbidity among the older adult population for a variety of physical and psychological diagnoses [33-35]. For example, mild cognitive dysfunction is frequent sequela of diabetes, complicating medical management of the condition [36]. Knowing whether the diabetic patient is comfortable utilizing Social domain media can help determine whether an electronic blood glucose monitoring system (whose reports can be tracked and communicated electronically to health providers) is accessible to the patient.

Clinicians and health care systems can use this information to determine which communication media are most accessible to patients, and thus most effective for communications between health care providers and patients to facilitate improved treatment outcomes and higher ratings of satisfaction by patients and providers of care. FACETS score can also suggest the extent to which the patient's treatment might be enhanced by technological assistance: occupational therapy, tutoring, coaching, mentoring, or personal instruction. Each of these interventions can be arranged in coordination with the various resources and other professionals supporting the patient. FACETS scores might also inform the clinician's decisions about the employment of additional assessment, as well as possible referral to other specialists, including occupational therapists, neuropsychologists, and neurologists.

Results

FACETS has been utilized in field trials with patients ranging in age from 18 to 94 years. So far, FACETS has demonstrated sensitivity to age and gender, with younger cohorts consistently achieving higher FACETS domain subtotal scores and FACETS total scores than older cohorts. Among adults over the age of 65, there are gender effects. Older female respondents consistently score higher than male respondents in the Social domain. Older male respondents consistently score higher than female respondents in the Home domain. Similar but less powerful gender differences occur in younger age cohorts (18 – 34, 35 – 44, 45 – 64, 65 and older), with gender effects increasing with age. Sample sizes to date have not been adequate to generate meaningful statistics, but initial findings are consistent and encouraging.

FACETS domain subtotal scores have also specified technologies with which individual older adults have greater or lesser comfort. These scores have informed the development of individualized treatment plans in psychotherapy with older adults.

Conclusion and discussion

FACETS was developed to identify the respondent's comfort using technologies within specific domains, which in turn will suggest technologies available to the respondent as resources. FACETS was designed to be sensitive to numerous variables, including age, gender, educational level, and socio-economic status. In field trials, FACETS has demonstrated sensitivity to age and gender, consistently demonstrating differences in scores between younger and older age cohorts, and between genders as age increases. Based on scores for comfort employing specific technologies, FACETS has been utilized to assist in the development of individualized treatment plans.

FACETS can provide population-based medical systems with data that make possible evidence-based decisions about how to communicate most effectively with each patient, and what IT resources are currently or potentially available to the patient. An example of such a system in the United States is Medicare. Medicare currently provides health care coverage to over 46.5 million Americans (over the age of 65), a number that is expected to more than double to over 98 million by 2060 [37]. It is estimated that by 2030, one in five Americans will be aged 65 years or older, and by 2060, nearly 25% of the population will be over 65 years of age [38]. Although IT utilization has increased among all age groups during the last two decades, people aged 65 and older continue to utilize IT at least 20% less than younger age cohorts [32,39-41]. Although older Americans are those least likely to utilize IT, the Center for Medicare and Medicaid Services (CMS) continues to increase pressure on subscribers to utilize IT in order to access or interact with them [42], effectively creating a barrier to health care for older Americans. Similarly, people with lower incomes are less likely than average to utilize IT [43]. CMS's insistence on subscriber use of IT for access to care also creates a barrier to care for low-income populations.

FACETS' sensitivity to variables including age and income level can be used to inform decisions made by large health care systems about what media to make available to subscribers for accessing

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care. FACETS data can be used in the same way by health insurance corporations, hospitals, and large health care clinics to determine the most effective means for communicating with their patient populations. The utilization of FACETS data by large health care systems has broad implications for improving access to care for a variety of populations whose relatively low IT utilization has been documented, but not assessed in a functional or individual manner that informs systemic decisions affecting access to care.

In a clinical context, assessment protocols for medical and mental health professionals have not included assessment of comfort utilizing technology [44]. FACETS data can be utilized clinically in the development of individualized treatment plans. Individualized treatment planning is more likely to engage the patient as an active participant in treatment, which is associated with better treatment outcomes outcomes [45-49]. FACETS data can be used to improve communication between care providers and patients, which is also associated with better health outcomes and increased ratings of satisfaction by patients and providers of care [19-22].

Knowing a patient's technological strengths, weaknesses, and preferences informs individualized treatment planning. FACETS scores can help direct clinical decisions about what IT media might be resources for use in each specific individual's treatment. For patients with comorbidity (especially prevalent among older adults), FACETS scores can be used to inform decisions about what media are most accessible for employment in patient treatment. An application of FACETS previously discussed is determining whether the use of electronic blood glucose monitoring is accessible as a resource in the treatment a patient with diabetes and comorbid cognitive impairment.

FACETS can also be used in evidence-based treatment models associated with better clinical outcomes. For example, in Great Britain, a care model specifically utilizing IT (in the Social domain of FACETS: email, text messaging, and social media) to create "digital circles of support" has been shown to reduce isolation, loneliness, and depression among older adults [50]. FACETS can be used to facilitate the employment of a "person-centered" model of care, which has also been shown to produce better treatment outcomes and higher ratings of satisfaction by patients and providers of care [51].

Technology is evolving rapidly. Technologies that are commonplace today will soon be modified or replaced entirely by new technologies. As technology continues to evolve, FACETS will require ongoing updating and revision to reflect extant technologies. Longitudinal studies using FACETS will be of value for understanding age and gender differences over time. Research is currently underway using large, randomized samples of the population to establish reliability and validity for FACETS.

Declarations

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