

A Multidisciplinary View to Motivational Aspects in Gerontechnology

Claudia Oppenauer & Ilse Kryspin-Exner

Abstract—Multidisciplinary research and models in the gerontology field are necessary for a profound knowledge and understanding of motivational processes in old people concerning their use of technology and how to train and motivate old people to use technology. The aim of this essay is to discuss different models and theories in regard to the motivation of old people to use new technical devices or systems.

Since in gerontechnology there is no satisfactory model used for motivation this essay tries to overcome this problem by discussing new aspects and models in psychology which could be useful for a better understanding of acceptance and use of technology in old age.

I. INTRODUCTION

Our society has to face several changes and trends, which partly lead to huge problems and unknown future scenarios. The aspect of our older growing population is actually untrue described: in industrialized countries people become older and older, but this is not the problem. On the contrary this is the consequence of good established health systems and progress in medicine. The problem is that the majority of countries have no sufficient pension plans and individuals do not yet feel responsible for private pension insurance. Moreover governments do not have enough financial resources to assure for good health standards in the future when the number of people needing health care will increase. Although the political discussion is very intensive solutions to these problems are far away. Concurrently, people tend to live in single households or if they raise a family are less willing to care for their relatives if they need care and support. Thus on the one hand we know that public financial support for care is decreasing but on the other hand private care systems from the families will vanish more and more. These facts promote technical support and compensation for financial and personal resources of our societies in order to prolong an independent life in old age.

Since a better understanding of the old person not only requires technology expertise but also psychological and social concepts, multidisciplinary research in the field of gerontechnology is necessary for explaining mechanisms such as use and acceptance of technology and its impact on human lives. Not only because of age related in changes in functional abilities as cognitive, psychomotor or perceptive

functions old persons pose a special user group but also due to altered motivation and psychological well-being. Further autobiographic aspects must not be forgotten and have a high impact on handling with new circumstances and on attitudes. In fact, understanding of old people and developing technological solutions and products demands exchange of expertise from many disciplines and use of well established concepts and theories.

Although there is plenty of literature dealing with gerontechnology only a minority of empirical research is based on theoretical concepts and approaches. This essay tries to give an overview about most suitable theories from psychology which could explain motivation to use technology in old age.

II. MOTIVATION THEORIES

A. Hierarchy of Needs Theory

The Hierarchy of Needs Theory by Maslow [1] arises from the Humanistic Psychology, which emerged in the 1950s as a cross-current to Behaviorism and Psychoanalysis. Maslow was beside Rogers, Bühler, Perls, and Goldstein one of the most known representative of this psychological school. Humanistic Psychology postulates that human beings always seek for self-actualization and personal development. In Maslow's Hierarchy of Needs Theory groups of needs are classified related to their meanings in the individual development of a person. Only unmet needs activate and influence human action.

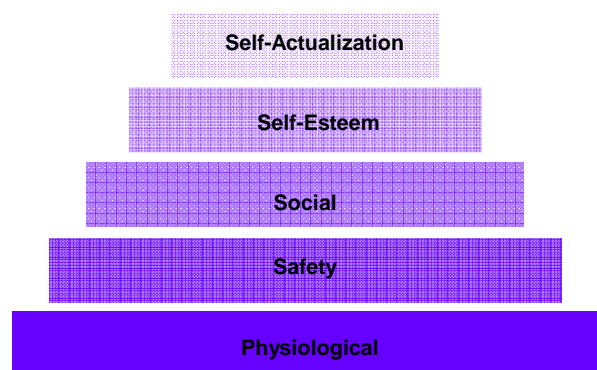


Fig. 1. Maslow's Hierarchy of Needs

Needs of lower groups as for instance physiological needs have to be met, in order to activate a higher group such as social needs. The last group including needs for self-actualization are only activated if needs of the other groups are satisfied. In this model self-actualization can only be achieved if other needs are satisfied and lower needs relay to the value of self-actualization. Maslow's

Manuscript received April, 30, 2008.

Both authors are at the Institute of Clinical, Biological and Differential Psychology, Faculty of Psychology, University Vienna, Austria (corresponding author phone: 0043-1-4277-47895; fax: 0043-1-4277-47899; e-mail: claudia.oppenauer@univie.ac.at).

hierarchy of needs theory is closely connected to the life span theory approach: at different developmental stages different needs have to be satisfied. Although the theory of Maslow is widely known and frequently cited in recent literature, it lacks empirical evidence because of the complex idea of needs and their broad definition. The popularity of Maslow's theory can be attributed to its possibilities of interpretation [2].

An empirical research study on older patients indicates that the relevance of needs changes in old age. 303 patients from a geriatric department of a Hungarian hospital were asked about their estimation of needs. Participants ranged their needs as following (beginning at the most important): self-actualization, safety, esteem, social and physiological needs [3].

Although further research studies considering needs in old age lack, Maslow's hierarchy of needs can be found in gerontechnology literature [4-5].

B. Murray's Theory of Psychogenic Needs

Murray distinguishes between needs and presses. Needs are defined as a "potentiality or readiness to respond in a certain way under certain given circumstances" and every press evokes a certain need. Murray listed a catalogue of 20 needs such as achievement, affiliation, defense or harm avoidance. Further primary and secondary needs exist. Primary needs are physical needs as water, food or cold avoidance and are cyclic or regulatory as cold avoidance. Secondary needs are psychogenic needs from the catalogue. In general needs from both categories can come into conflict with one another or conflate. Since one aim of empiric research is to describe phenomena precisely and cluster information, one major criticism of Murray's theory is that 27 independent needs are not advisable from this point of view [2].

C. Emotional Information Processing

Needs and motives are always linked with emotional information processing. Emotions and feelings have a major effect on decision-making and motive related actions. Referring to the theory of Murray emotions are a sort of interface between needs and presses. Emotions can enhance individuals and can act as a kind of positive reinforcer and a reward. In this way emotions act as a very influential motive system, and have a both conscious and unconscious impact on human behavior. Ekman [6] defined six basic emotions: surprise, happiness, sadness, disgust, fear and anger. From a phylogenetic view emotions are especially relevant in situations where a very quick reaction is needed in order to maintain well-being. Since emotions are the first response to a stimulus the organism has enough time to react adequately. In this way humans can accommodate to new and complex situations and requirements. One approach to include emotional process in motivation theories is to distinguish between *state* and *trait* emotions: state emotions are temporary variable emotions which highly depend on environmental conditions, whereas trait emotions illustrate the emotional disposition of a person and are more steady and independent from external factors [2].

D. Zürcher Modell of Social Motivation

The Zürcher Modell of Social Motivation by Bischof deals in its main parts with emotional bond, security, dependence and autonomy motives of individuals. Bischof postulates four major motives: appetite or aversion of security and appetite or aversion of excitement. These motives comply with individual set points: if recognition of security is higher than the set point the person experiences weariness. Whereas motives for security and bond are activated if the perceived security is lower than the set point. This model is in some parts very similar to the model of Maslow because needs are perceived where deficits are recognized by the individual [2].

E. Cognitive Dissonance

According to Feichtinger individuals seek harmony, consistence and congruence in cognitive elements as for example knowledge, opinions, ethical values or attitudes. If the relationship between two of such elements is inconsistent the person will try to reduce this negative emotional affect in order to reconstruct harmony by changing one or more elements and its importance and moral value or by adding another element. Another very common cognitive style in order to reduce dissonance poses selective information seeking: information which appreciates a decision or an opinion is preferred and other information is ignored and will be avoided [7].

F. Self-Determination Theory

Deci and Ryan distinguish between intrinsic and extrinsic motivation. Intrinsic motivation includes behavior which aims for autonomy, competence and relatedness and is therefore not connected to an external reward system or

drive satisfaction. If a person behaves in a certain way due to the expected consequences he or she is extrinsic motivated. Following Deci and Ryan intrinsic and extrinsic motivation are connected to mental health and subjective well-being. According to the theory it is essential for the individual to satisfy the needs for competence and autonomy for psychological well-being. With regard to therapy motivation and compliance it is important that the client experiences a high level of intrinsic motivation and autonomy [8].

In a study by Kasser and Ryan [9] 50 nursing-home-residents were interviewed in terms of subjective vitality, well-being and distress. The results show that perceptions of autonomy support from family and friends were connected to lower depression, increased well-being, vitality and life satisfaction. According to these results, autonomy support is a major predictor for well-being. Further subjective vitality was associated with lower distress level.

III. THEORIES OF SUCCESSFUL AGING

A. Selection, Optimization and Compensation

Baltes and Baltes [10-11] developed a model of successful ageing with the components: *Selection*, *Optimization* and *Compensation*. They postulate that old

people select and concentrate on domains of high priority and try to increase know-how and capacity in these domains. The consequence is a restricted but effective way of life. If necessary the person is motivated to compensate in these chosen domains by activating own and/or social resources or changing their environment for example. Thus technologies for older people could be seen as resources in this model in order to maintain activities and psychological well-being.

Another theory by Baltes [12] covers dependency in old age. Especially in old people who need professional nursing and care. Baltes describes the phenomenon of learned dependence in old people who need professional nursing and care. If assistance is provided in situations where the person could cope on her own, abilities will be unlearned because the person will no longer be motivated to carry out activities which need more effort.

These concepts are especially relevant in the context of assistive technologies where technical support could lead to an overprotection of the individual.

B. Socioemotional Selectivity Theory

During the life span individuals develop different priorities concerning their motivation. Carstensen et al. [13] distinguish between aims for knowledge and information acquisition and emotional regulation. If the time perspective of the individual is limited the person aims for emotional regulation and is highly social motivated. This process can already be recognized in early adulthood and is also valid for younger adults who experience a limited time perspective as for example during a severe illness.

IV. THEORIES IN HEALTH PSYCHOLOGY

A. Theories of Control

Theories of Control as for example the Locus of Control Theory by Rotter [14] have a high impact on areas such as physical and mental health. According to the theory a high perception of control is relevant for interpreting life events as a consequence of own behaviour and therefore a precondition for high self-esteem and self-confidence. It is supposed that that people with a high internal locus of control are more successful in dealing with technologies.

Findings of the already mentioned European Mobilate survey indicated that higher technology use is related to higher internal locus of control and lower external locus of control [15]. Correlations showed a slight tendency that technology users feel less controlled by external circumstances and that they generally feel empowered concerning their own life.

B. Self-Efficacy

Another theory where control has a major role is the concept of *self-efficacy* by Bandura [16]. People with high self-efficacy are convinced that they can influence situations and life events. These beliefs strongly determine emotional, cognitive and motivational structures as well as psychological well-being. People with strong self-efficacy

perception interpret difficult or new tasks rather as challenging than threatening. Failures are more likely attributed to insufficient effort or lacking knowledge. Persons with high self-efficacy have a lower vulnerability for depression or other affective disorders.

Finally, *self-efficacy beliefs* about capabilities to use technical devices have to be mentioned. Results of a German study on digital wristwatch use showed that higher internal locus of control significantly coincided with higher coping strategies relating to technical problems [17].

C. Concept of Hardiness

The Concept of Hardiness by Kobasa [18] is a very popular concept in health psychology and an effort for explaining coping with stressful live events. For optimal adaption and coping with stress individuals should experience a high level of control in their lives. This control in turn increases resilience and mental health. Therefore three conditions are necessary: the persons have to experience commitment, challenge and control. Regarding the use of technology in old age, this model could give an important input how technology should address to older users and, which aspects have to be considered (see Figure 2).

Commitment	Challenge	Control
Technology assists in leisure activities; engages social contacts	Technology arouses interest and curiosity	Technology enhances feelings of control

Fig. 2. Three Cs by Kobase: Commitment, Challenge, Control

V. DISCUSSION AND OUTLOOK

According to Roger, Mayhorn and Fisk older people are – contrary to stereotypes – willing to use new technologies and in form of adequate training very adaptive if the benefits of the technical device are apparent and understandable[19]. From a psychological point of view it is significant to consider age-related losses in cognitive and psychomotor functions as well as resources and capabilities of the elderly. Further, motivational aspects have to be included in order to predict use of a technological device. Nevertheless, there is a lack of theory driven research and sufficiently operationalized variables in the gerontechnology empirical research.

The given overview about possible motivational theories from psychology should inspire to consider one of these theories in future studies and to cooperate with experts from psychology. Multidisciplinary research is also necessary to avoid financial and technical disadvantages [20] and to guarantee that the technical device or system is useful for the enduser and therefore an important possible resource. Future research will show if and which of the presented theories will become accepted and if one of

these is able to explain motivational aspects in technology use.

REFERENCES

- [1] A.H. Maslow, *Motivation and personality*. New York: Harper, 1954.
- [2] D. Scheffer and H. Heckhausen, "Eigenschaftstheorie der Motivation" in *Motivation und Handeln*, J. Heckhausen and H. Heckhausen, Eds. Heidelberg: Springer, 2006, pp. 45–72.
- [3] E. Majercsik, "Hierachy of needs of geriatric patients," *Gerontology*, vol.51, no.3, pp.170–173, 2005.
- [4] J.E.M.H. van Bronswijk, "Gerontechnology Motivation," *Gerontechnology*, vol.5, no.2, pp.65–67, 2006.
- [5] R. Urwiler and M.N. Frolick, "The IT value hierarchy: Using Maslow's Hierarchy of needs as a metaphor for gauging the maturity level of information technology use within competitive organizations," *Information Systems Management*, vol. 25, no.1, pp. 83–88, 2008.
- [6] P. Ekman, "Universals and cultural differences in the facial expressions of emotion," in *Nebraska Symposium on Motivation*, J. R. Cole, Ed. Lincoln: University of Nebraska Press, 1971, pp. 207–283.
- [7] J. Beckmann and H. Heckhausen, "Situative Determinanten des Verhaltens," in *Motivation und Handeln*, J. Heckhausen and H. Heckhausen, Eds. Heidelberg: Springer, 2006, pp. 73–103.
- [8] P. Bles, "Die Selbstbestimmungstheorie von Deci und Ryan," in *Theorien der Sozialpsychologie*, D. Frey and M. Irlle, Eds., Bern: Hans Huber, 2002, pp. 234–256.
- [9] V.G. Kasser and R.M. Ryan, "The relation of psychological needs for autonomy and relatedness to vitality, well-being and mortality in a nursing home," *Journal of Applied Social Psychology*, vol.29, no. 5, pp. 935–954, 2007.
- [10] P.B. Baltes and M.M. Baltes, *Successful aging: Perspectives from the behavioral sciences, 1990*, New York: Cambridge University Press.
- [11] P. B. Baltes, U. Lindenberger and U.M. Staudinger, "Life-Span Theory in Developmental Psychology," in *Handbook of Child Psychology, Volume 1: Theoretical Models of Human Development*, W. Damon and R.M. Lerner, Eds. New York: Wiley & Sons, 1998, pp. 1029–1043.
- [12] M.M. Baltes, "Verlust der Selbständigkeit im Alter: Theoretische Überlegungen und empirische Befunde," *Psychologische Rundschau*, vol. 46, pp. 159–170, 1995.
- [13] L.L. Carstensen, D.M. Isaacowitz and S.T. Charles, "Taking time seriously: A theory of socioemotional selectivity," *American Psychologist*, 1999, vol. 54, 165–181.
- [14] J.B. Rotter, "Some problems and misconceptions related to the construct of internal versus external control of reinforcement," *Journal of Consulting and Clinical Psychology*, vol.43, 56–67, 1975.
- [15] M. Tacke, F. Marcellini, H. Mollenkopf, I. Ruoppila and Z. Szeman, "Use and Acceptance of New Technology by Older People. Findings of the International MOBILATE Survey: Enhancing Mobility in Later Life," *Gerontechnology*, vol. 3, no.3, pp. 126–137, 2005.
- [16] A. Bandura, *Self-efficacy*, 1997, New York: Freeman.
- [17] G. Beier, *Kontrollüberzeugungen im Umgang mit Technik. Ein Persönlichkeitsmerkmal mit Relevanz für die Gestaltung technischer Systeme*, Berlin: dissertation. de – Verlag im Internet GmbH, 2004.
- [18] S.C. Kobasa, S.R. Maddi and S. Kahn, "Hardiness and Health: a prospective study," *Journal of Personality and Social Psychology*, vol. 42, pp. 168–177, 1982.
- [19] W.A. Rogers, C.B. Mayhorn and A.D. Fisk, "Technology in Everyday Life for Older Adults," in *Gerontechnology. Research and Practice in Technology and Aging*, D.C. Burdick and S. Kwon, Eds. New York: Springer, 2004, pp. 3–18.
- [20] J. Seale, C. McCreddie, A. Turner-Smith and A. Tinker, "Older people as Partners in Assistive Technology Research: The Use of Focus Groups in the Design Process," *Technology and Disability*, vol. 14, pp. 21–29, 2002.