

USE OF CLINICAL DECISION SUPPORT SYSTEMS BY GPs

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A narrative review

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Introduction

There is evidence that electronic clinical decision support systems can positively impact healthcare providers' performance.¹ While clinical decision support systems have many benefits for healthcare professionals, providing these tools does not guarantee uptake.

Objectives

These are:

- to identify a list of the barriers and facilitators to GPs adopting clinical decision support systems
- to provide a model to help explain the relationship between these factors.

Method

We completed two separate searches of the PubMed, CINHAL Plus and Scopus databases. The first was to identify the literature on GPs adopting clinical decision support systems, the second to identify theories to influence GPs' practice.

Results and discussion

The searches yielded 341 results. After removing duplicate papers, a screening of the article titles and an abstract review against the objectives of this paper, 12 papers remained. We identified three additional papers in the reference lists, bringing the total to 15.

We identified 23 barriers and 22 facilitators to GPs adopting clinical decision support systems.

Many models explain the acceptance and use of clinical decision support systems, originating from theoretical insights used in psychology, sociology and information systems. It is suggested that the most sensitive model is the unified theory of acceptance and use of technology (UTAUT).²

The unified theory of acceptance and use of technology

The UTAUT synthesises eight behavioural models/theories, pulling together their significant elements. The UTAUT comprises four main determinants of behavioural intentions and use behaviour.

These are: perceived usefulness (performance expectancy); perceived ease of use (effort expectancy); social influence; and the perception that organisational and technical support exists (facilitating conditions). In addition, the UTAUT proposes four moderating variables – age, gender, experience and voluntariness of use. The moderating variables are suggested to influence the relationships between the four constructs and intended use.

The identified barriers and facilitators were mapped to the UTAUT.

Developing the unified theory of acceptance and use of technology

Nothing was identified within the literature on the factors facilitating GPs' use of clinical decision support systems for the construct of social influence. Nothing was identified for the modifying variables of age or gender.

Nothing was identified within the literature on the barriers to GPs' using clinical decision support systems for the construct of social influence. Nothing was identified for the modifying variables of age, gender or voluntariness of use.

As the UTAUT was developed combining multiple theories,² we suggest that these factors may still have a role to play in adopting clinical decision support systems. Therefore, these factors should still be considered when trying to bring about change in GPs' behaviour.

There are several factors identified within the literature that were not able to be classified under the constructs

and moderating variables of the UTAUT. We propose that the following additions are made to the model.

Beliefs as a moderating variable

To incorporate 'acceptance', 'openness to use a clinical decision support system', and 'resistance to change'.

Involvement

To incorporate 'involvement in design and development' and the 'ability to make modifications', affecting behavioural intentions and use.

Trust in knowledge base

To incorporate 'trust in knowledge base' and 'developed by a trusted source', affecting behavioural intentions.

Threat to decision making and patient relationship

To incorporate 'threat to the doctor/patient relationship' and 'loss of reasoning and clinical autonomy', affecting behavioural intentions.

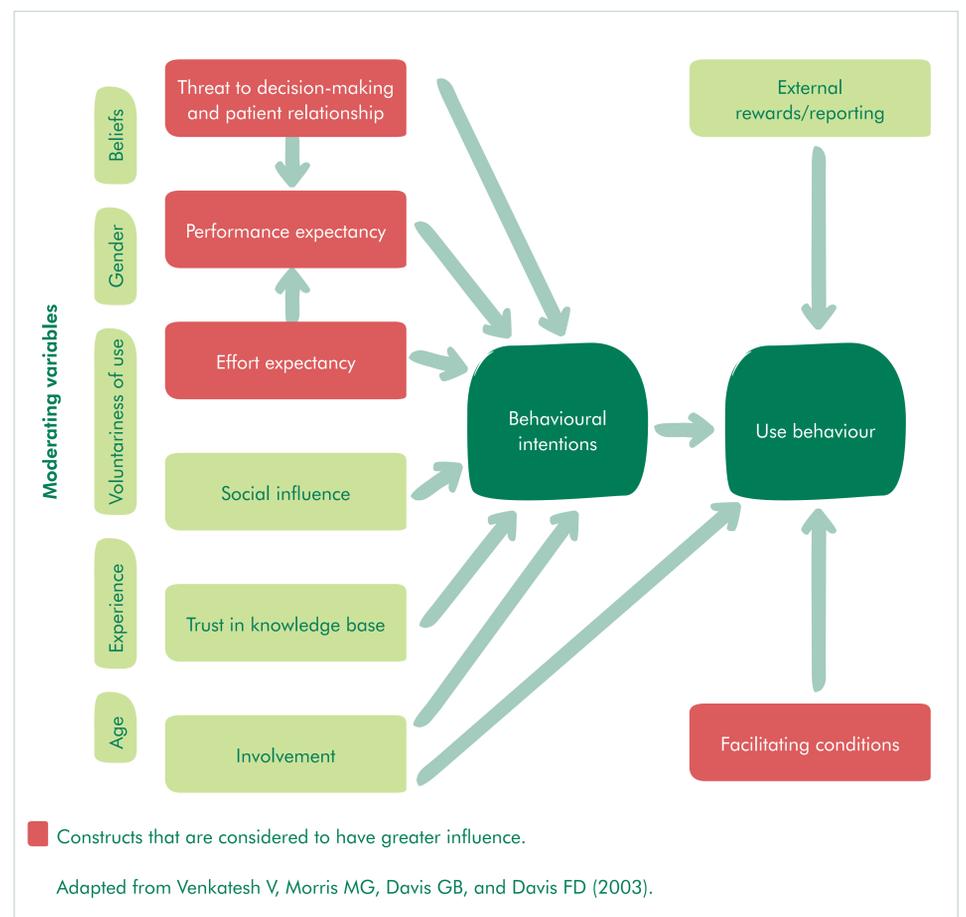
External rewards

To incorporate 'external rewards and reporting', affecting behavioural intentions and use.

UTAUT construct/moderating variable	Mapped facilitators	Mapped barriers
Performance expectancy	Agreement with recommendations Improved knowledge/professional development Usefulness in consultation Assists decision making Better quality of care Patient point-of-care information Facilitates patient discussion Embedded patient education Increased alertness/awareness Time saver	Lack of evidence on effectiveness Poor quality of information/message Disagree with recommendations Prompts considered to be of limited value Lack of time Elements considered not useful
Effort expectancy	Ease of use	Not intuitive to use Message fatigue/erroneous information Need to adapt practice Extra workload Altering the current practice workflow
Social influence	Nothing identified in the literature	Nothing identified in the literature
Facilitating conditions	Fit within current workflow Training provision Based on practice needs	Unreliable Poor system integration Computer/network issues Lack of computers No implementation plan Altering practice workflow Lack of standardised software Security concerns
Gender	Nothing identified in the literature	Nothing identified in the literature
Age	Nothing identified in the literature	Nothing identified in the literature
Experience	Nothing identified in the literature	Experience (computer literacy)
Voluntariness of use	Commitment to use	Nothing identified in the literature
Miscellaneous	Acceptance Openness to clinical decision support systems External rewards/reporting Involvement in design and development Ability to make modifications Trust in knowledge base Developed by a trusted source	Threat to doctor/patient relationship Loss of reasoning and clinical autonomy Resistance to change

Figure 1

Use of electronic clinical decision support systems by GPs – an adapted version of the 'unified theory of acceptance and use of technology'



References

- Jaspers MWM, et al. Effects of clinical decision support systems on practitioner performance and patient outcomes: a synthesis of high-quality systematic review findings. *J Am Med Informatics Assoc.* 2011. 18(3): 327–34.
- Venkatesh V, et al. User acceptance of information technology: toward a unified view. *MIS Q.* 2003. 27(3): 425–478.

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Conclusions

It has been suggested that the UTAUT is a sensitive model to predict the use of clinical decision support systems. We have recommended additions to the UTAUT based on the literature.