Study on Effectiveness of Computer Support for Care Management

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Abstract

We have developed a software that supports care management by the KOMI Chart System, aimed at improving the visibility of the KOMI Chart System with functions for drawing, revising and observing the time-series charts. The purpose of this study is to evaluate the effectiveness of computer support for care management. The experiment results showed: (1) the time required for care planning was reduced, and (2) grasping client’s daily life was affected by the speed of drawing the KOMI Chart.

1. Introduction

The KOMI Chart (Kanai Original Modern Instrument) System [1] has been developed to determine the needs for care and support in the care-planning process as a method to assess clients. This method has already been employed in care management in the actual care-providing arena. The education for care planning using the KOMI Chart System is offered at hospitals, elderly facilities and nursing schools, and “Care Designer” has been developed as a software to support care management in those institutions. Results of questionnaires confirmed that this software is a useful tool for improving efficiency in care management [2].

2. Features of the KOMI Chart System

There are three essential feature of this system:

1) The KOMI Chart System is designed to help judge the cognitive and behavioral aspects of the client. The KOMI Chart System consists of 15 headings, each of which includes 5 checkpoints, making 77 cognitive checkpoints, and 78 behavioral checkpoints, making 155 checkpoints in total.

2) The layout is deliberately graphical so that all information can be grasped intuitively.

3) Care planning is based on the KOMI Theory, which inherits Florence Nightingale’s nursing spirit.

3. Features of Care Designer

We realized following three functions to draw, manage, and observe the KOMI Chart effectively.

1) Drawing functions: These functions allow users to draw KOMI Charts more easily, quickly, and clearly. It is possible to draw a KOMI Chart by operating a mouse, just like painting on a sheet.

2) Editing and management functions: These functions enable users to see results processed with the computer quickly. We can manipulate an object on the screen directly, and can see its result visually, thus we can easily edit work.

3) Observing function: We can monitor the time series change visually. This function shows a Radar Chart and the KOMI Chart with the time series. Three charts are shown on one screen; they designate the care plan for a given day. This function is used to evaluate care service.

4. The evaluation of Care Designer

Fig. 1 Input and output window of the KOMI Chart
We mailed the questionnaire to 451 to evaluate Care Designer and received 41 replies. The purpose of this questionnaire was to evaluate the operability of Care Designer in detail, along with each process. To study the effectiveness of computer support for care management, we devised following three questions.

1. Comparing handwriting on the record forms with writing using a computer.
2. Do the functions support the role of each record form?
3. Do the functions speed-up writing?

We derived the following results from answers to the questionnaire:

1. Does using Care Designer reduce the time-consuming burden of care planning?
   We show whether Care Designer solves the problem of large time-consuming burdens of care planning.
   (a) According to data from the Ministry of Health, Labor and Welfare, care planning for a client takes an average of three hours and 34 minutes (3). As a result of the questionnaire investigation, 33 users answered that the time required for planning the care of a client was within two hours.
   (b) A subjective evaluation was carried out by users to determine whether the time-consuming burden of each process in care planning was appropriate. The result of the questionnaire investigation, indicating that more than 89% of users answered the time required for care planning is appropriate in five processes.

2. Does Care Designer support qualitative improvement in a care plan?
   To examine the possibility of qualitative support, we determine whether Care Designer supports the qualitative improvement in a care plan.
   Regression analysis was applied to show clearly which evaluation item has how many effects on the evaluation item with respect to the quality of a care plan.
   (a) Principal component analysis
   Principal component analysis was performed on 17 items that were related to the item “a client’s daily life can be grasped intuitively.” Consequently, the following four principal components was extracted. The first principal component can be interpreted as “time,” the second one as “performance,” the third as “the operability,” and the fourth one as “the effect of the original function with a computer the supports drawing of the KOMI Chart.”
   (b) Multiple regression analysis
   We performed a multiple regression analysis for the independent variables that were the four principal components obtained by the principal component analysis, and the dependent variable “a client’s daily life can be grasped intuitively.” The following regression equation was obtained from the analysis result.

   \[ Y = 0.478 \times \text{time} + 0.054 \times \text{performance} + 0.078 \times \text{operability} - 0.188 \times \text{various types of functional effects} + 3.516 \]

   The coefficient of determination is 0.596, thus the goodness of fit of the regression equation is moderate. However, the result of the analysis of variance is \( F (4, 30) = 9.606, p =0.000 \), thus we considered that the regression equation above is useful. “Time” and the “various types of the functional effects” have a large coefficient in this form, and we considered that “time” and “the effect of various functions” are accepted as independent variables of the item “a client’s daily life can be grasped intuitively”.

5. Conclusion
   We show the results of analysis as follows:
   (1) The time-consuming burden of care planning is reduced, and the time required for care planning falls to a level acceptable to the user. As a result, Care Designer is effective in solving the problem of a large the time-consuming burden in care planning.
   (2) The reduction of the time is effective in evaluation items that are themes of the KOMI Chart for “client’s daily life can be grasped intuitively.” As a result, it is necessary to consider how the reduction of the time realizes each process of not only drawing charts, but also care planning.

6. References