Research

Decision support system for conflict diagnosis in personnel selection

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Abstract

A decision support system (DSS) is discussed here. It was developed to analyze the interpersonal behavior of members of a work team; they are tested while interacting in a set of situations simulating a daily working session. By comparing the reactions of each member, it is possible to assess the members’ working style compatibility. The system can, therefore, be configured to test specific features of interpersonal behavior, such as potential conflict factors; these can then be used to assess the effect of adding a member to a team during personnel selection. Field tests have showed that the system can satisfactorily predict potential conflicts within a group.

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1. Introduction

Too much conflict in a work team decreases its level of productivity by lowering the motivation of its members [7, 11, 12]. High levels of conflict can be partially avoided by either working with the group to establish healthy relationships among the members or carefully selecting the people who are going to join it [5]. In both situations, it is necessary to develop an accurate profile of the group behavior and the type of interactions that occur among the different members.

If the team has a good initial profile, it can even improve, but teams that begin with difficulties find that their ability to work together is further diminished with time [6, 13]. An adequate mixture of personalities is, however, necessary to ensure that members can learn from each other. When adding a new team member, the process of detecting the candidate’s personality characteristics is important; the problem is in determining whether the interviewee would not ‘fit-in’ to the current group. However, the group should not be too heterogeneous [1]. Since people do not change radically with time, someone unsuitable at the start will probably remain so [3].

Simulation is an appropriate technique to aid personal selection. One of several forms of simulation is Role Playing. It consists of introducing the candidate to the members of the group and simulating the team’s work, based on the classical assumption of behavior...
consistency: past conduct is the best way to predict future conduct [9]. It can present a set of possible causes of conflict to the candidate and, after testing, analyze his or her reactions to the different stimuli; this will probably need an expert to estimate potential incompatibilities with other members of the team. The observed behavior of the candidate allows the expert to assess the strengths and weaknesses of the relationship between members and, thus, to consider how they would affect the team’s productivity if the candidate is hired or included. Although this technique might be very accurate, it requires extensive work, both from the candidate and the team, and therefore it is rather expensive [2]. An alternative consists in asking the candidate to describe, either through an interview or by a pencil and paper test, how he or she would confront a specific situation related to the group’s activity. Although its implementation and application cost is low, the outcome could be inaccurate since the candidate can calmly guess what is the ‘correct’ answer in order to be hired.

A third alternative, developed here, is a DSS that requires the candidate and the current team members to go through a computer-generated simulation that helps in detect potential conflicting behavior. A computer simulation is fast and accurate; it can dynamically and transparently adapt its operation to each type of user. It also allows the decision maker to measure variables that are difficult to obtain by simple observation, such as the timing and other parameters in the process of the analysis and decision making [4, 8].

2. Architecture of the decision support system

The main users and components of the decision support system are depicted in Fig. 1. The interested people are a candidate applying for a job, the current staff members of a team and an external evaluator assessing the candidate’s suitability. The components are a simulator that interacts with the candidate and all the staff members, one person at a time; an editor used by the evaluator to customize the simulator; and a data analyzer that generates a set of statistics outcomes used by the evaluator.

The evaluator can either be an organizational expert, a psychologist, or the personnel manager in charge of hiring new employees. Through a knowledge acquisition process, the evaluator must identify the potential conflict factors within the organization and determine how they must be measured.

The system was tested in two companies, the following were assessed [10]:

- Attitude toward explicit or implicit rules of the group
- Commonality of interests with the company and its employees
- Attitudes toward task distribution; Causes of work satisfaction
- Individualistic or team oriented working style
- Relationship with supervisors and authority.

The editor is an application that allows the creation of a script that defines the simulator’s flow. The script describes a decision tree, such as the one depicted in

![Fig. 1. System components and information flow.](image-url)
Fig. 2, where the person being evaluated navigates through the choices. Each node of the tree corresponds to a scene from the team’s everyday working. It consists of a picture showing a number of participants, including the candidate, talking about a subject or facing a given situation. Two types of scenes are defined: decision and continuation scenes. In the former, as illustrated in scene Nos. 1 and 6, the candidate is asked to select from a number of options the one that best represents his or her reaction. For the latter, such as that shown in scene No. 2, there is only one option and such scenes are used to create a context that is intended to achieve a realistic sequence of events. Each option leads to a new scene, making the overall effect an interactive test that adapts to the answers given by the person. The sequence of branches that are actually visited defines the person’s story.

Each of the factors that may cause conflict are implicitly included in one or more of the scenes. Every time the person selects an option from them, he or she is showing how he or she would react to such a condition; the system will assess the degree of certainty by determining the consistency with which the options have been selected. For instance, suppose that scenes Nos. 1, 6 and 18 are designed to measure the person’s individual or team-oriented work style. If all the selected options are individual in nature, then it has been determined that, with a high degree of certainty, the person’s working style is individual.

After the candidate and each staff member has gone through the simulation, the data analyzer generates an output for the evaluator, who uses it as an antecedent for deciding whether to hire the candidate. The results are displayed in a comparative way rather than absolutely, since a given feature is not good or bad in itself; its nature depends on the team’s characteristics. As an example, a prospective candidate with a strong preference towards a team-oriented working style may not be suitable for a group whose members are known to be highly individualistic.

It is important to note here that a difference of opinion between the candidate and the team is not necessarily bad. What produces conflict is the intensity of the disagreement and the way that each member of the team deals with it. For this reason, for any given factor, a large sequence of scenes is necessary in order to detect whether the person will be capable of adapting to the group.

3. Script creation

The editor function helps in creating a script, which is a general evaluation tree. It defines all possible consistent sequences of scenes that determine the set of behaviors. The editor was implemented under Microsoft Windows™ using Visual Basic™, and it has incorporated the usual graphic user interface (GUI) capabilities, such as a window manager, drag and drop options, push down menus, etc. The editor illustrated in Fig. 3 allows the decision maker to build a scene by specifying an image and a text for it. It also defines a text for the three possible options, e.g. a, b and c and the corresponding next scenes numbers, e.g. 14, 15 and 24, respectively.

The editor allows complementing the images with dialogue balloons, as shown by Fig. 4. The size and position of the balloons, as well as the text within them, is set to match the content of the image. Finally, an arrow can be added to the balloon in order to give adequate reference to the character ‘speaking’. It has been noted that using more than three balloons per scene can result in visual saturation.
4. Presentation of results

The data analyzer processes the information for each person who runs the simulation, and presents it in a comprehensive way that allows the evaluator to compare the profiles of the candidate and the team members. Fig. 5 shows the results for a specific factor, the team working style, of the candidate and the group members: Nancy, Paul, Peter, Robert, Ruth and Sam. The vertical axis represents the three possible options for a given factor: team-oriented, midpoint and individual. The system graphically presents the degree of certainty: a short rectangle indicates that the subject presents a specific attitude or profile about the factor being analyzed, while a tall rectangle represents uncertainty.

Fig. 5 shows that Robert has a strong midpoint attitude, while Nancy and Ruth are strongly team-oriented. Sam shows a low level of certainty between team oriented and midpoint, while the candidate shows relatively high certainty for individuality. The clearest judgment differences, for this specific factor, appears to be between the candidate, Nancy and Ruth, since these three show high certainties giving opposing answers.

A complementary measure of uncertainty may be assessed by recording how much time it took each person to select the options related to a given factor. Longer times suggest that the person had to think about the issue before deciding, while shorter times indicate that the answer came naturally. For that reason, the diagram also shows how long it took for each person to select an option. The candidate took the longest time with 121 s while Sam took the shortest time with only 85 s.

Fig. 6 uses pie charts and bar graphs to show the aggregated results for the 22 factors being analyzed. These diagrams are used to represent the overall ratio.
Fig. 4. Definition of dialogues.

Fig. 5. Diagram of attitude for a specific factor.
of agreement–discrepancy, and the frequency with which a discrepancy was observed. For instance, the candidate report shows that 20 of the factors were ‘in-agreement’ between the candidate and the group, while two situations were ‘in discrepancy’. The Staff Report shows that there is an average discrepancy of 2.5 in the staff. Ruth and Sam are above average (dark bars), with five and six discrepancies, respectively, while Nancy, Paul, Peter and Robert have only one discrepancy each.

These results are not necessarily good or bad. They only compare the team behavior in a very specific simulated situation. Conflicts may appear for many other reasons that cannot be monitored through a computer-based simulation. Therefore, the quantitative information provided by the system should be analyzed according to the group context, the organization, and what the company expects of its employees.

5. Validation of the tool

The capability of the tool to diagnose causes of conflict within a team was compared to the opinion of a person who was already familiar with the team. This person will be termed the judge. All members of the group were asked to run the simulation, and their results were summarized in a verbal manner such as: “Sam is the person most likely to be in conflict from a time-consciousness point of view.” These results were later rephrased as questions to be asked to the judge: “Who is the person most likely to come into conflict with others of the team from a time-consciousness point of view?” If the judge mentions Sam, then the system and the judge agree. This technique is repeated for each of the factors. Finally, the output from the system was correlated with the opinion of the judge in order to quantify the degree of coincidence.
The tool was validated using a script that is geared to evaluate teams that work in a project related agenda, rather than teams that work in a more continuous sense. Field tests were performed on three working teams from industry: one from a utility company, and two from an oil company. These companies agreed to provide employee time and working space for interviews and simulations. In return, they were able to use the tool since it proved to be useful for the company. In all these groups, the judge was the corresponding supervisor. The final results are presented in Table 1.

A correlation that is equal to 1.0 means that the system can, in about one hour, achieve the same level of knowledge about the team as the supervisor has gained during years of work. A correlation of 0.0 means that the system provides no valuable information to the evaluator. A correlation below 0.0 means that the system is making mistakes. The supervisors agreed to consider a correlation of 0.5 to be satisfactory, or at least a reasonable starting point to improve the system. Considering such criteria, the field test showed a good predicting capability for the system.

### 6. Conclusions

This paper introduces a tool for detecting potential conflicts within a group; it is assumed that the company can interactively adjust the group in reaction to the results, and is able to make changes immediately. It is comparatively inexpensive to implement, because it does not require much time from the people to whom it is applied. An editor allows customizing to the staff context in order to detect specific team behavior features.

A first evaluation was performed with a script targeted to groups that work in a project-based manner. Those groups were already operational, so there was an independent opinion with which the results of the tests could be contrasted. Such a contrast showed a satisfactory predicting capability for the system, depending on the quality of the script; from this, the group mix can be further evaluated and improved.

In order to assess which team behavior features—other than conflict—can be measured using this technique, we presented the system to 28 experts who are in charge of the hiring process of different companies. These experts come from banks, financial services, telecommunication industry and other companies. The features most frequently mentioned were supervision style, communication style, conflict potential, and the decision-making process. The combined preferences are presented in Table 2, showing which were the first, second, third and fourth choices. For the expert from a bank, the first option is to use this tool for detecting the communication style, then the supervision style, thirdly the potential conflict, and finally decision-making process.

On account of the high number of preferences favoring supervision and communication style assessments, new scripts are being developed for diagnosing those working features within a given group. For both cases, the factors have been already identified and the script are currently under construction.

### References


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