COGNITIVE STYLE TAILORED ACCOUNTING INFORMATION SYSTEMS[1]

by

Miklos Antal Vasarhelyi

Faculty of Management, RutgersUniversity

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ABSTRACT

This paper describes the results of an experimental study where subjects were provided with "customized" information systems based on the categorization of the subject's cognitive style.

Information systems are tailored with respect to two variables: type of data and degree of aggregation. Cognitive styles are measured within the heuristic/analytic framework.

The experiment involved a stock portfolio decision setting in which subjects were given historical accounting data on three stocks, a limited budget with which to buy information, and the opportunity to invest in these stocks. This setting is low in terms of diagnosticity but adequate to examine the subject's information preference, usage and processing.

Data analysis emphasizes the differences of behavior in terms of feature access, decision time, portfolio composition, nature of information used, and total gains/losses by the subjects during the experiment. Results indicate cognitive style and information structure effects that deserve further study. Investor outcomes were significantly different in the first experimental period and converged towards common results as previous research suggested.

The aggregation and type of information variables showed promise as design variables for accounting information system and decision aid cognitive style tailoring. The results also suggest further examination of the issues related to cognitive style tailoring within different contexts (tasks) and with different design variables.

INTRODUCTION

The study of human information processing in accounting, in particular the "cognitive style research" [Ashton, 1978], has led to findings concerning decision characteristics and information utilization parameters. Aggregation preference (e.g.,[Otley, 1982]; [Tiessen, 1976]) and information type (e.g., [Vasarhelyi, 1977]) have been found to be related to cognitive style. Benbasat and Dexter (1982) found performance improvements by decision makers using decision aids in task environments unsuitable for their cognitive styles.

The evolution of computer technologies has resulted in more modular and more flexible data processing systems at the same or even reduced costs. These systems tend to be developed in-house and tailored to the corporate organizational structure.

Increased comprehension of common decision patterns among individuals of similar cognitive style, in conjunction with developments in computer technology, make possible the tailoring of information systems not only to organizational structure but also to the ^&individual\& making decisions. Mock et al. (1972, pg. 147) state that "..further research is needed to develop a taxonomy of relevant decision-maker characteristics which can be used to design more individualized information systems."

This paper describes the results of an empirical study that tested the effects of cognitive style tailoring of information structures. Decision makers were classified within the Analytic versus Heuristic (AH) taxonomy through a self-evaluation instrument [Vasarhelyi, 1977]. They were assigned to three different information structures and asked to make three portfolio selection decisions. Their decision processes were unobtrusively traced and timed while charges were made for information request and decision time.

RESEARCH QUESTIONS

The basic research questions being addressed examine the potential of tailoring information systems to different cognitively styled individuals.

- Is cognitive style a relevant information system design variable?

- Can tailored information systems improve the cost versus benefit balance of decision support?

Mock and Vasarhelyi (1978) proposed an information economics based model to represent human information processing. The model's main elements are: states-of-the-world (S), messages (Y), judgments (X), actions (A), and outcomes (O).

Accounting information consists of messages on the state of the world [$Y = f(X)$]. These cues are continuous scales stochastically related to continuous states of the world. Judgments are based on these messages, processed according to a set of rules most of which are relatively unknown, leading to added stochasticity in the process [$X = f(S,Y)$]. Actions, based on judgments of the environment, add to the sequential link and to the random component of the function [$A = f(S,X,Y)$]. Finally, the model of the process is completed by the outcomes, which in this simplified stock selection problem do not present a strong relation to decision maker actions [$O = q(A)$; $O = f(A,S,X,Y)$].

In consequence, outcome (performance) results will have low association to states-of-the-world and cues. This low diagnosticity effect is also the reflection of two additional factors: (1) the stock market is efficient, therefore all information has been impounded into stock prices, decreasing the action (A) / outcome (O) relationship, and (2) subjects will compensate over the experimental period for their information processing weaknesses and/or processing strengths.

Stronger association is therefore expected when examining relationships among the earlier links in the chain, such as decision maker actions (stocks chosen, amount of information used), judgment behavior (time taken for decision, type of information used), and information cues available.

Cognitive Style Measurement

Alternative cognitive style measures are available in the literature. This study uses the Analytic versus Heuristic (AH) framework ([Huysmans, 1968; Mock2, 1984; Dickson, 1977] for decision maker classification. The self-evaluation questionnaire (Vasarhelyi, 1973; [Zmud, 1977] was used as the measurement tool.

The AH framework presents some analogous features to Witkins et al. (1967) field independence concept. Several studies in the literature [Lusk, 1973; Benbasat and Dexter, 1979; Otley and Dias, 1982] use the Embedded Figures Test [EFT] [Witkins, 1967] test to classify individuals as "low analytics" or "high analytics." Aggregation and data type preferences are among the variables that can be found in these studies.

.Tailored Systems

Decision makers are provided with information structures that, according to previous cognitive style studies, are better fitted to specific types of decision makers. This is denominated cognitive style tailoring of information systems. Tailoring of information systems may serve to improve the overall decision outcome or to change the cost/benefit tradeoffs in the decision process. In consequence, systems may be tailored to support and enhance human decision maker performance. Among the several variables studied in the HIPS/cognitive style literature, two will be used in this study -- aggregation and type of information. These will serve as parameters in information systems design and related to decision maker cognitive style.

Information Structures"

Figure 1 displays the three cognitive style tailored information structures. Studies by Mock et al. (1972), Lusk, 1973, Driver and Mock (1975), Vasarhelyi (1977, 1981), Benbasat and Dexter (1979, 1982) led to the normative statements concerning decision maker preferences encompassed in information structures 1, 2 and 3.

INFORMATION STRUCTURE CHARACTERISTICS

	Information	Information	Information
	Structure	Structure	Structure
	1	2	3
	(IS 1)	(IS 2)	(IS 3)
Prescriptive System	Analytics	Heuristics	Weakly Analytic
	_	_	or
Counter-Prescriptive System	Heuristics	Analytics	Weakly Heuristic
FINANCIAL STATEMENT ELEMENT			
Balance Sheet	Disaggregate	Aggregate	Choice
Income Statement	Disaggregate	Aggregate	Choice
Funds Flow	Disaggregate	None	Choice
Security Prices	No differ.	No Differ.	No differ.

President's Letter	Not avail.	Available	Available
Industry Forecasts	Not avail.	Available	Available
Financial Ratios	Disaggregate	Aggregate	Choice

Information Structure 1 (IS 1) will provide disaggregate quantitative information to its users. IS 2 will provide aggregate quantitative as well as qualitative information. IS 3, on the other hand, will give subjects choice of information to be used. Figure 2 describes the design used in this set of experiments. In the figure, the Ps represent the cells used in prescriptive mode where the "correct" information structure is given. The Cs represent the counter-prescriptive mode subject assignment where, for example, heuristics are given the information structure that is prescribed as best for analytics. The Z represents subjects given any information contained in either information structures IS 1 or IS 2.

EXPERIMENTAL DESIGN"

		Information	Information	Information
		Structure 1	Structure 2	Structure 3
Group	Style	(IS 1)	(IS 2)	(IS 3)
1	Analytics (A)	P	C	
2	Heuristics (H)	C	P	
3	Weakly As - Hs			Z

Comparison between use of IS 1 and IS 2 in prescriptive and counter-prescriptive mode by analytics and heuristics respectively, allows for the examination of differences in information structure utilization among decision makers. IS 3 permits the examination of weakly analytics and heuristics vis-a-vis a more complete information set. This analysis assumes that the information overload threshold has not yet been reached [Casey, 1980].

This design, parsimonious in nature, allows for the comparison of prescriptive versus counter-prescriptive modes. In addition, it allows for subjects of "weak" cognitive style to compare their natural data preferences.

Research Hypotheses"

Within the context of the above experimental design, a set of specific research hypotheses can be postulated to shed some light on the general research questions.

H1: Subjects using the three prescriptive information structures will exhibit significant choice differences at the beginning of the experiment.

Differential portfolio choices by subjects are reflected by their actions and aggregated into a value outcome (performance). Previous studies (Mock et al., 1972; Otley and Dias, 1982) indicate steep learning curves and some cognitive style related difference in early decision periods. Later decision periods will tend to show decision convergence. Subjects of different cognitive styles will, upon the progress of the experiment, compensate for information processing deficiencies with increased use of effort and of their processing strengths.

No overall differences in performance are expected due to both low data diagnosticity and compensating behavior. Portfolio performance will be measured by the summation of gains or losses over the three year period.

H2: Prescriptive information structures will lead to different cost/benefit performance than counter-prescriptive structures.

Benbasat and Schroeder (1977) found cost improvements through the use of decision aids by decision makers. Benbasat and Dexter (1982) found larger decision aid usage by analytics than heuristics. They suggested that "... an appropriate information system design can help to overcome a mismatch between task environment and psychological type."

Usage of cognitive style tailored information will change information utilization and access characteristics and, consequently, affect the cost/benefit tradeoffs. These changes may be reflected by several factors, namely: number of information accesses, time of information usage, performance change, and behavioral satisfaction with the task. The performance variable O has weak linkage with decision maker action A, which in turn is expected to have stronger association to decision maker's judgment X.

In operational terms, this study will measure information resource utilization as being composed of two elements: (1) data access charges, and (2) linkup time charges. The first represent data procurement and retrieval costs while the second represent online access and computer utilization charges. Pankoff and Virgil (1970) also used information charges where rates were arbitrarily set at the beginning of the game. Learning effects were also observed by Otley and Dias (1982) without significant cognitive style related differences.

H3: Analytics will incur more information cost than heuristics.

Analytics, as data users, will tend to use more information, particularly in the early decisions before the models are developed. Mock et al. (1972) observed model building behavior by analytics, leading to increased decision time at the beginning of the experiment and rapid decisions at later stages. This decision time increase reflected the increased usage of information for model building and, at later stages, the usage of this same expanded information set, now being simply used in a completed model.

The next set of hypotheses relate to subjects that rated themselves as weakly analytic (WA) and weakly heuristic (WH) and were given the same information structure (IS 3) with choice options.

H4: Cognitive style will discriminate information type usage.

H4 is based on results from Vasarhelyi (1977). In that study, analytics were more comfortable with numerical data while heuristics opted for qualitative data. In the present study, heuristics are prescribed president's letters and corporate forecasts as qualitative information. In addition, they are given summary quantitative information. Analytics are prescribed all the quantitative information given to heuristics in a more detailed manner, receiving in addition funds flows. An effort has been made to balance the contents of the two information structures. Nonetheless, some non-observed content differences are considered unavoidable.

This hypothesis may provide considerable insights on types of data to be kept in computer databases as well as the manner in which information should be made available (e.g. in narrative form as opposed to tabular form).

H5: Weakly Analytics will tend to use disaggregate data while Weakly Heuristics will use aggregate data.

Analytics have a greater ability in processing numerical information and building formal models. In consequence, they will look further into information details, as opposed to heuristics who will tend to concentrate on the overall framework and make decisions on a trial-and-error basis. Benbasat and Dexter (1982) found differential performance improvement with aggregate information. Their findings can be related to Vasarhelyi (1977), where heuristics used less information in a planning context.

These hypotheses will be tested based on the number of accesses and information requests made by the subject to the discretionary information structure provided.

METHODOLOGY AND EXPERIMENTAL METHODS"

Subjects were placed in a simplified market setting and asked to make portfolio investment decisions regarding real-world securities. The choice of stock market emulation was made in order to have a decision problem with: (1) accounting information, (2) repetitive nature, (3) some external validity, and (4) a good motivational tie with accounting courses.

The problem of market-efficiency vis-a-vis actual performance of subjects is a serious one. It may be argued that what individuals do in a market does not translate easily into aggregate price and investment effects. However, if differential information preference and processing is the object of this study, the efficiency of the market is of no concern as far as pure performance is not emphasized. If there is any information content in financial reports, its use should lead to performance improvement. Pankoff and Virgil (1970, pg. 18) concluded in an analogous context that "...the information provided in this experiment to analysts makes them superior forecasters on average to students with no information except past prices and dividends."

The design, as described in Figure 2, allowed for examination of partial and complete information set use (and availability). Its parsimonious nature permits considerably smaller samples at some cost in terms of generality and comprehensiveness of results.

Problem Scenario"

Subjects were given $10,000 to invest at the beginning of each of three years. They were given historical data for previous years 0 to 6. Their decision periods 1, 2, and 3 corresponded to years 7, 8, and 9 respectively. They could choose among three stocks or keep cash which would pay a pre-set risk free rate. Stocks could not be sold and the investment proceeds at the end of each year were not cumulative.

A maximum return could be obtained by picking the right stock at decision time and investing the entire money on this stock for the period. This maximum performance would imply a gain of 19.1%, 35.12%, and 29.00% for periods 1 through 3. Stock choice implied different risk preferences by subjects.

Three companies from diverse industries (energy, data processing, and banking) were randomly chosen. Their data were simplified and selected sections of their annual report were made available to the subjects. A general description of the economic environment was supplied at the start of the game. Specific market factors were incorporated in the "industry forecast" variable.

Information Structures"

Three alternate information structures as described in Figure 1 were made available, respectively, to the three experimental groups. In addition, information structures 1 and 2 were given to analytics and heuristics in a counter-prescriptive mode. Data from years 0 to 6 were available to subjects. As the information structures are different, a confounding factor of potential differences in information content was introduced. Unfortunately, external validity considerations made it undesirable to control for this factor.

Information Cost"

A limited, but not constraining, amount of information access was given to the subjects. Charges were incurred by each information access (except for data of year 0 which were given at no query cost) and by terminal linkup (experimental) time. The information currency was not cumulative nor convertible into trading dollars. These rules allowed for a more realistic, but still simple environment, where time and information are not free goods.

Decision Support System"

The Accounting Data Analyzer (ADA), to be used with a video display terminal, was designed for utilization within an MBA accounting class as an assignment for the section on "Financial Ratios." Appendix 1 illustrates a simplified experimental session. Students were allowed to use pencil and paper for related notes but could not keep hard copy of the data they received. The system was easy to learn and to use.

Measurement Instruments"

A bio-data form and unobtrusive traces were administered through the ADA system obtaining background, feature utilization and decision time data. Traces were performed by the computer which recorded all data and software features utilized as well as the time dedicated to each display used. A debriefing questionnaire was administered at the end of the experiment. The AH instrument was part of the bio-data questionnaire and triggered the information structure selection.

DATA ANALYSIS AND RESULTS"

Table 1 summarizes the bio data while Table 2 displays additional background data. The original sample of 170 subjects was reduced to 138 for reasons discussed below.

Table 1: BIOGRAPHICAL DATA

Age (mean)	25.93 years
Work exp. (mean)	3.6 years
Part time work exp. (mean)	1.3 years
Number of College Yrs.(mean)	4.3 years
Gender (frequency)	87 males

	51 females

Table 2: BACKGROUND DATA

Cognitive Styles	
Analytics	32
Weakly Analytics	40
Weakly Heuristics	20
Heuristics	46

	138
Graduate Major	
Business	80
Law	7
International Affairs	18
Engineering	11
Other	22
Undergraduate Major	
Technical Fields	39
Business	12
Liberal Arts	87

Hypothesis testing"

After pilot runs (with about 20 subjects), 170 students from the first and second financial accounting class for MBAs participated in the experiment. Subjects were requested to participate in the experiment for "extra credit" in the class and were told that it was an "integrating" exercise.

Computer failures and communication among participants (contaminating the experiment) reduced the usable sample to 138 subjects. Subjects were eliminated through the examination of their computer logs: If these were below a minimum threshold in length or they denoted computer interruptions, subjects were eliminated from the sample.

H1: Hypothesis 1 was tested through a one-way analysis of variance comparing the period 1 performance of subjects using information systems in the prescriptive mode. Significant performance differences were observed at the 10% level. Further examination of the data indicate compensating and convergent behavior for periods 2 and 3 leading to no overall choice differences.

Group 1 was composed of analytic decision makers, group 2 of heuristics and group 3 of a composite of weakly analytic and weakly heuristics subjects. The F statistic of 1.25 for all periods is, as expected, not significant at the 10% level. The same test applied independently to periods 1, 2, and 3 leads also to differential learning patterns detected among periods whereby results show performance differences between groups in the different periods as shown in Table 3.

Table 3: MEAN PERFORMANCE PER PERIOD AND OVERALL MEAN GAINS FOR A 10,000 INVESTMENT"

Cognitive Style	H	A	WA	WH	Value
SAMPLE	(32)	(19)	(40)	(20)	
Overall	4204	3867	3377	3950	1.25
Period 1	1290	1160	1098	1234	2.38*
Period 2	1673	1282	1183	1353	1.38
Period 3	1241	1424	1097	1362	0.49

NOTE: * Significant at the 10% level.

These data show differential learning patterns such as found in Mock et al (1972). Within this experimental context, performance differences imply different patterns of stock choice using the selected information. Decision makers develop substantially different strategies reflected by performance data.

H2: Based on the analysis above, no overall performance differences were found between cognitive styles using the prescriptive mode. Table 4 shows comparisons between the prescriptive and counter-prescriptive usage of IS 1 and IS 2. These results also show observable period 1 differences in performance.

Table 4:PRESCRIPTIVE x NON-PRESCRIPTIVE MODE COMPARISON"

	Means	F Stat.	Means	F Stat.		
	A	HEC		H	ANC	
Overall Results	3866	4336	.61	4204	3906	.26
Results Per.1	1161	1022	1.24	1289	11352.52*	
Results Per.2	1282	1704	1.35	1673	1525	.24
Results Per.3	1423	1639	.48	1241	1247	.00
Time Per 1	1281	863	2.42*	1209	1293	.14
Rupees Per 1	44	30	2.35*	45	46	0.00
Use Sec.Prices	4.26	3.14	1.17	3.69	4.08	.15
Use Ratios	8.79	5.14	3.76*	6.81	8.92	1.23
Use Inc.Stat Disagr.	8.63	6.79	.87			
Use Funds Flow	1.95	4.00	2.50*			
Use BS Disagr.	5.53	421	.72			
Use I's Agr.				5.22	5.08	.01
Use B's Agr.				4.66	1.92	4.34**
Use Industry Inform.				6.41	6.38	.00
Use Pres. Letter				6.06	6.69	.22

NOTE:
ANC Analytics Counter-Prescriptive Mode
HEC Heuristics Counter-Prescriptive Mode
* Significant at the 10% level.
** Significant at the 5% level.

These results show mixed cost/benefit changes in the prescriptive mode. The results indicate similar levels of performance at larger cost (in terms of time and number of accesses) of the prescriptive mode usage. On the other hand, the results also seem to indicate prescriptive mode users to be more interested and comfortable with the information being supplied.

Further examination into information usage adds support to prescriptive information system comfort and preference. Table 5 compares prescriptive versus counter_prescriptive information usage times. All comparisons between the prescriptive and counter-prescriptive modes show higher time usage by the users of the first type of information system. This reflects the average amount of time subjects spent examining data.

Table 5: MEAN TIME AND ACCESS FREQUENCIES"

	A	HEC	H	ANC
Time Period 1*	910	600	383	362
Time Period 2	484	478	198	188
Time Period 3	503	363	161	132
Info Freq. Per. 1	12.6	9.0	14	14
Info Freq. Per. 2	8.0	7.9	10	10
Info Freq. Per. 3	8.6	6.4	9	9

NOTE:
* Average time in tenth's of a second
HEC Heuristics Counter-Prescriptive Mode
ANC Analytics Counter-Prescriptive Mode

In addition, the examination of frequency of data accesses shows increases of data usage in the prescriptive mode, particularly in the comparison of analytics versus counter-prescriptive heuristics. Notably, the means for the H and ANC groups are very similar in terms of information frequency.

It is also desirable to examine potential interaction between the factors cognitive style and information structure. A two way analysis of variance on overall performance as described in Table 6 was performed using Walker and Lev's (1953) simplified procedure with a sample size of 13 per cell.

Table 6: TWO WAY ANALYSIS OF VARIANCE OF PERFORMANCE OVERALL MEANS"

	Prescriptive	Counter-Prescriptive
Analytic	3867	3908
Heuristic	4204	4366

No significant factors were found. F values for the prescriptive dimension and the cognitive style dimension were 1.22 and .91 respectively. On the other hand, a significant (# < .1) interaction factor (F = 3.18) was found, indicating that information systems had a differential impact on heuristic decision makers. These results support earlier findings by Benbasat and Dexter (1982).

H3 Table 7 displays the two information variables supplied to both analytics and heuristics in comparable modes. Both variables present the direction prescribed in H3, one with significant values partially supporting the stated hypothesis.

Table 7: INFORMATION USAGE [Accesses]"

	A	H	F Value
	_	_	_
Variables	(15 Ss)	(30 Ss)	
Use of Security Price Information	5.1	4.7	.16
Use of Ratio Information	11.1	7.3	5.15 *

NOTE:
* Significant at the 1% level.

H4: An index of quantitative and qualitative information was developed. This index is a simple summation of number of accesses to the quantitative and qualitative information respectively. The indexes are relevant only to IS 3 users (WAs and WHs), as these received complete information structures. One tail t-tests were performed to test for significance in the difference of means. These are reported in Table 8.

Table 8: INFORMATION USAGE FREQUENCIES"

Variable number	Information Set	WA (Ss=40)	WH (Ss=20)	t Score	Direction of Mean	Difference
_						
1	Sec.prices	3.40	4.05	.79	NA	
2	Ratios	6.55	5.25	.74	E	
3	Aggr.Inc.Stat.	3.10	2.95	.13	I	
4	Disag.Inc.Stat .	2.55	1.30	1.48*	E	
5	Aggr.Bal.Sheet	1.6	2.90	4.48**	E	
6	Disag.Bal.Sheet	2.03	1.60	.52	E	
7	Funds Stat.	2.10	1.00	1.56*	E	
8	Industry Forecast	6.25	7.55	1.30*	E	
9	Pres. Letter	4.52	5.30	.64	E	
10	Qualit.Index	21.32	19.05	.71	E	
11	Quant. Index	10.78	12.85	1.13	E	

NOTE:
* Significant at the .1 level WA Weakly analytics
** Significant at the .05 level WH Weakly heuristics
E - expected direction I - unexpected direction
NA - not applicable

A close examination of the data above shows t scores insufficient to reject the null hypothesis in 7 out of 11 cases. However, the data show in most cases (9 out of 10) the predicted directionality and notable difference between means. These results are interesting and stronger than the ones in previous studies.

H5: Observing lines 3,4,6 and 7 of Table 8, the aggregation preferences hypothesized can be observed. They show the predicted direction and considerable differences among means. Aggregation effects have consistently appeared in cognitive style studies. Analytics significantly preferred disaggregate information while heuristics tended to concentrate on aggregate information.

The overall results in Hypotheses 1 through 5 show differential learning, aggregation and information type preference effects. They support Libby and Lewis' (1982) comments on cognitive style research "*... the difficulties faced in the search for a direct link between personality or cognitive structure and decision behavior are ... a reflection of the complexity of the relationships involved...*"

Highly structured tasks (Benbasat and Dexter, 1982; Otley and Dias, 1982) indicate different but also noticeable cognitive style effects vis-a-vis decision aids. Future research must, in a controlled mode, include the task variable in this type of study. P. Wright (1975) found that task affected accuracy and performance in a marketing context. Similar effects are likely to be found in accounting studies. Bettman and Zins (1979) also examined task, but using time as a measure in studying choice and format. Task was found to have more effect over time choice than over format choice. If a cross-disciplinary extrapolation would be valid, this would imply little influence of task over information type some over decision time. The comparison of the results of these experiments and the more structured tasks seem to point in this direction.

Table 9 summarizes the research findings. The findings primarily indicate: 1) learning and compensating behavior, and 2) aggregation and type of information preferences.

Table 9: SUMMARY OF FINDINGS"

Hypothesis	Stated	Statistics	Support
H1	Period 1 choice diffs.	F=2.38	Supp.
	H x A x WA x WH		
H2	Changes in Cost/Benefit		Not Supp.
	relationships		
	A x HEC; H x ANC		
H3	Diffs. in info cost	F=.16	Part. Supp.
	A x H	F=5.15	
H4	Info use differences		Part. supp.
	WA x WH		
H5	Aggregation preferences		Supp.
	WA x WH		

The two key research questions of this study are related to the issues of cognitive style relevance and the tailoring of information systems. Information use differences (Tables 7 and 8) support the relevance issue. The aggregation and type of information variables seem very promising as tailoring parameters.

Secondly, it may be desirable to link information resources to the actual cash available for trading. This would give additional stress to information costs. Such an approach would require a realistic comparative assessment of information costs.

Thirdly, the question of market efficiency and its effect on the low diagnosticity of the data is of major importance and may be the key contributor to diluted results. Results can only indicate differences among cognitive styles and processing effects. These results seem to be found in the data.

CONCLUSIONS

This study was designed to examine the effects of cognitive style tailoring of management information systems. A theoretical construct of human information processing was used for the generation of hypotheses. A decision support system was used to provide the tailored information structures.

The methodology seems promising in terms of unobstrusive monitoring of decision processes and computer-based analysis of lengthy protocols. This methodology also allows for larger samples to be considered as a variation of standard process tracing in protocol analysis (e.g. Biggs and Mock, 1980).

In addition, the results are interesting enough to warrant further extension and exploration. A series of variables such as mode of presentation, timeliness of information and information content may be introduced to expand the scope of the study. Furthermore, better examination of learning effects may be obtained by increasing the number of decisions. A replication of the experiment within a different task (e.g. bankruptcy prediction) may allow to circumvent some of the problems discussed above. Of particular potential interest may be the usage of a context in which there can be causal linkage between actions and performance presenting higher outcome diagnosticity. There, the cost and benefit issues can be analyzed with more care. Further experimentation, along the lines of a more complete experimental design, may allow for a more in-depth data analysis and for stronger potential conclusions about the desirability of cognitive style tailoring of information systems.

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