CHOOSING TOURISM LOCATIONS: PERSONAL VERBAL DECISION ANALYSIS SUPPORTED BY MULTIMEDIA

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ABSTRACT
This paper examines how to support individual tourists in choosing locations/accommodation to visit during their stay in a locality. We show how this kind of decision making can be aided through a multi-stage verbal decision making process, including both formal and informal aspects, supported by an information system which can provide descriptions in both text and audio-visual form of the alternative under consideration at each stage of the process. The tourist decision-maker will need a structure in which he or she can express his or her initial preferences verbally. These will not be for named locations but, rather, for descriptions of aspects selected for detailed consideration. Thus we describe the provision of a generic preference structure of aspects on which the decision-maker can identify verbally expressed levels at which all the potential alternatives have been pre-classified. Since this generic structure is unlikely to contain classification information on all the aspects that an individual decision-maker may consider in the particular context, the system gives the decision maker the opportunity to explore particular alternatives (in multimedia where appropriate) to develop verbal descriptions of the levels on criteria which are personally relevant in deciding among alternatives.

1. INTRODUCTION: CHOOSING AND EXPLORING A SET OF TOURIST ATTRACTIONS

Tourism is one of the most important growth industries of the new millennium: More people have more time and more funds to travel, national barriers to travel are being dismantled across the world, air transportation at affordable cost is available between a rapidly increasing number of locations. Tourism, if properly managed is also seen as an important component of local development by local authorities in areas which are often struggling to maintain a sustainable economy because of their remoteness, lack of industrialisation, or reliance on a traditional way of life and methods of production. Such characteristics are likely to increase a locality's potential attractiveness to tourists, but they also indicate difficulties in competition in a global economy in the absence of support from local tourism. But the changes we are seeing should not be viewed simply in terms of self-sustaining growth. Over-intensive tourist development in many resorts in Europe during the last 30 years has led to those resorts being abandoned by more discerning tourists, who see the aspects of the local environment which originally attracted them to the resort being swallowed up by the growth of precisely those "tourist developments" which were supposed to attract them. The result is that such resorts are forced down market in their search for new clientele.

In general, tourists have increasing experience, visiting a wide variety of locations on holiday, which affects the way they structure their preferences in seeking out locations to visit next. However, they are also faced with an ever-increasing range of advertising and information sources about tourist locations seeking to attract them. The second half of the twentieth century saw the rapid growth of the package tour, whereby tourists would buy from the tour operator, or from a travel agent acting for the operator, a complete package comprising air-travel, accommodation and excursions throughout the stay at the resort. But now tourists, even those

purchasing "packages" desire to be increasingly independent and discerning, tailoring their exploration of the area they choose to visit according to their own preferences.

However, at the time of planning a holiday trip, the individual will often look for a "new" destination, seeking help from sources available while still at home (tourist guide books, travel agents) or on arrival at the holiday destination (tourist bureaux) about how to plan a local itinerary of places to visit and/or stay which meets their specific requirements. They are likely to express their requirements verbally, but would also like to explore the descriptions of particular locations in multimedia form (viewing pictures and video-clips as well as reading more detailed written descriptions) – to get a "feel" for locations they have not yet visited.

Immediately the individual tourist, in seeking to review such material, is faced with information overload. For example, in visiting a particular island for two weeks, there may be 100 locations to visit, and time to visit 15-20; there may be 200 places to stay of varying degrees of sophistication in varying location – how to select which ones? There is not enough time to read everything about everyone – and there would be far to many alternatives and details to be able to keep enough in mind to build an optimal, or even satisfactory, itinerary. Yet it is important to make an optimal itinerary *a priori*. The two weeks' holiday time is limited and the tourist will be anxious to enjoy every moment, without having to correct time-consuming and frustrating mistakes in choice of location, or spend all the time locally collecting information on where to go next, only to find (all too often) that the decision was made too late, the chosen accommodation/trip is now sold out.

To help a tourist to make the best choice of locations, a special kind of decision support system could be developed. The idea is to divide the selection process into two parts. In the first part, the tourist puts forward some preliminary requirements for the possible locations to visit. On the basis of such requirements it is possible to reduce considerably the number of possible alternatives. In the second part of the selection process, the tourist makes more detail exploration of remaining places using rich information provided in multimedia form.

In the following sections we review how this kind of decision making, can be aided through a multi-stage verbal decision making process, including both formal and informal aspects, supported by an information system which can provide descriptions in both text and audio-visual form of the alternative under consideration at each stage of the process. As we will see the problem of providing requisite decision support throughout the process is more complex, and more interactive, than just one of appropriate description of alternatives and means for their retrieval from a database via a browser. The tourist decision-maker will need a structure in which he or she can express his or her initial preferences verbally. These will not be for named locations but, rather, descriptions of aspects of locations, which the decision-maker would like to be present in the locations selected for detailed consideration.

Since the information system will need to be able to characterise the alternatives on which it has information according to the decision maker's expressed verbal preferences, there will need to be a generic preference structure of aspects on which the decision maker can identify verbally expressed levels at which all the potential alternatives have been pre-classified. However, this generic structure is unlikely to contain classification information on all the aspects that an individual decision-maker may consider important in identifying preferred locations to visit in the particular context. Therefore we will describe how a system can be developed where the decision maker has the opportunity to explore particular alternatives to identify additional, personally relevant criteria in deciding among alternatives, and to build a formal set of alternatives selected according to his or her own descriptions within a classification scheme. This classification scheme is enriched through his or her own verbal descriptions of the aspects of the locations which matter, expressed and ordered as levels on criteria.

2. PRELIMINARY CLASSIFICATION OF LOCATION WITH THE HELP OF VERBAL DECISION ANALYSIS.

In this section we describe the approach we take in preliminary classification of possible tourist locations on the basis of initial verbal descriptions given as an input to the decision-maker. We describe how the specification of the ordinal criteria scales is confirmed through dialogue with the decision-maker in developing descriptions that are based on existing information about alternatives and that satisfy the decision-maker.

2.1.The approach of Verbal Decision Analysis.

For the solution of this classification problem we prefer to adopt here the approach called Verbal Decision Analysis (VDA). VDA makes it possible to utilise only natural language in all steps of the problem solution (Larichev, 1987, 1992; Larichev and Moshkovich, 1997). It is particularly appropriate in situations like the tourist decision maker's problem where:

- The preference structure describes aspects of alternatives which are essentially qualitative and subjective in nature; the process of the task analysis is also subjective by nature: rules for consideration and comparison of the qualitative factors are mainly defined by the decision maker. Such problems are called 'unstructured' (Simon and Newell, 1958).
- The decision-maker prefers to describe the problem and its components in a way that matches his usual discourse in talking about it (c.f., Humphreys, 1998). At every step in the process of analysing the problem, the decision-maker needs an explanation of the results obtained.
- It must be recognised that the decision-maker is the key element of the problem. Attention must therefore be paid to the capabilities and limitations of human information processing system and to the way the decision-maker wishes to approach and structure the problem (Kahneman, Slovic and Tversky, 1982, Berkeley and Humphreys, 1982).

The scientific criteria for the justification of a decision method aimed at the solution of unstructured problems must be psychological criteria for the interaction between the decision-maker and the method (Larichev, 1984; Humphreys, 1989). This allows us to define the following requirements for the decision-making methods (Larichev, 1987, 1992):

- psychologically valid measurement of factors which are important for the decision;
- a psychologically valid way of the eliciting information in the construction of a decision rule;
- the possibility of checking the decision maker's consistency;
- the possibility for providing explanations;
- the possibility for the gradual development of a decision rule.

A family of decision methods meeting these requirements have been developed recently (Larichev & Moshkovich, 1997).

2.2 Techniques for developing a multi-criteria problem structure for verbal decision analysis.

For the last two decades, the most popular approach to the solution of multi-criteria problems is that provided by MultiAttribute Utility Theory (MAUT, *c.f.* Humphreys, 1977; Edwards and Newman, 1982). The obligatory first step in the application of MAUT is the transformation of the description of the problem, as originally made in natural language (see above) into a quantitative one. This could be done in several ways. First, one could provide a quantitative scale and ask the decision-maker to find corresponding numbers for each qualitative evaluation. For example, a 9-point scale is constructed where 9 indicates the "best" quality and 1 indicates the "worst" quality. An alternative approach is to use the so-called 'membership function' from

fuzzy-set theory. Here, the decision-maker must define intervals on a quantitative scale, which correspond to qualitative evaluations.
In each case, by making such transformations one loses the original, intuitively understandable definitions of quality grades in natural language and has to use instead an unnatural numerical language. The decision-maker ceases to have his or her common sense connected with a meaningful representation of the problem. A second difficulty is connected with the construction of utility function on the basis of quantitative measurements. The operations with numbers, required to establish scale positions and make trade-offs, are not understandable by the decision-maker. It is also quite difficult to explain the results of the problem solution to the decision-maker in terms of such numerical positions and tradeoffs (Berkeley, Humphreys, Larichev and Moshkovich, 1991).
Another possibility exists: to make all the analysis using qualitative variables without any transformation into numbers. Naturally, a decision maker, in solving initially unstructured problems which are important for himself or herself, is inclined to pose questions in a language he or she understands and wants to receive an answer in the same language.
A reliable and feasible method of measurement for the majority of factors is verbal qualitative estimates on each criterion at ordered levels (ordinal scales). For example in grading hotels, the English Tourist Board uses the following ordered descriptions:

ONE CROWN: Accommodation with facilities including washbasins in all bedrooms, a lounge and use of a phone
TWO CROWN: A wider range of facilities and services including morning tea and calls, bedside lights, colour TV in lounge or bedrooms, assistance with luggage
THREE CROWN: At least one-third of the bedrooms with ensuite WC and bath or shower, plus easy chair, full length mirror. Shoe cleaning facilities and hairdryers available. Hot evening meals available.
FOUR CROWN: At least three-quarters of the bedrooms with ensuite WC and bath/shower plus colour TV, radio and phone, 24-hour access and lounge service until midnight. Last orders for meals 98.30pm or later.
FIVE CROWN: All bedrooms having WC, bath and shower ensuite, plus a wide range of facilities and services, including room service, all-night lounge service and laundry service. Restaurant open for breakfast, lunch and dinner.

In the above order "more crowns are better", but a decision maker may wish only to achieve a "satisfactory" level on the criterion: i.e., desiring to stay in a hotel with a rating of at least a particular number of crowns, but not necessarily insisting on the highest rating (particularly if it costs a lot more per night's stay).

2.3. Construction of the decision rule for classifying alternatives on the basis of verbal description on criteria

The approach of Verbal Decision Analysis is based on the utilization of information processing operations that are admissible from a psychological point of view in the construction of a decision rule. In the case of multicriteria classification, the fundamental operation is the attribution of alternatives to different decision classes. The psychological validity of such operations has been investigated in (Larichev et all, 1988). The reliability of human classification depends on the parameters of the problem, i.e., the number of criteria (attributes), the number of estimations on verbal criteria scales and number of decision classes.
The problem under consideration may be presented in the following way (de Montgolfier and Bertier 1978, Larichev and Moshkovich 1994). A decision-maker has a final set of N decision classes and must assign to them a set of cases (in this application, these cases are locations to visit while on holiday). These classes are ordered for a decision maker in the sense that each object placed in the first class (e.g., "it would be wonderful to visit the location") is preferable to

all objects placed in the second class (e.g., “it would be interesting but not essential to visit the location”), and so on. Each object can be characterised by values on each of Q criteria. Values upon criterion scales are presented to the decision-maker in verbal form. The decision-maker orders each criterion scale from the most to the least preferable one. The problem can be represented formally in the following way:

GIVEN:

1. $K = \{q_i\}, i = 1,2,\ldots N$ - a set of criteria;
2. w_q - number of possible values on the scale of the q-th criterion;
3. $X_q = \{x_{iq}\}$ - a set of values for the q-th criterion (the scale f the q-th criterion) ordered from best (first) to worse (last);
   $|X_q| = w_q$;
4. $Y = X_1 * X_2 * \ldots * X_N$ - a set of vectors $y^i \in Y$ of the following type $y^i = (y_1^i, y_2^i, \ldots y_N^i)$, where $y_q^i \in X_q$;
5. $L = |Y| = \left| \prod_{q=1}^{N} w_q \right.$ - capacity of Y;
6. M - number of ordered decision classes.

NEEDED: on the basis of a decision-maker's preferences (judgements) to build a reflection F: $Y \Rightarrow \{Y_j\}$, $j = 1,2,\ldots M$ such that $Y = \bigcup_{j=1}^{M} Y_j$; $Y_l \cap Y_k = 0 \; if \quad k \neq l$ (where Y_j - a subset of vectors from Y, assigned to the j-th class).

Let us stress that, according to this statement, it is necessary to construct the complete classification – the rule for the assignment of any vector from Y to a decision class. The practical importance of this requirement is evident in the example given above: one does not know beforehand which variants of a case (location) could be under consideration.

2.4. Consistency testing of personally constructed decision rules

One of the inherent characteristics of human behaviour is the tendency to make errors. In transmitting and processing information, people make errors. They make less, even considerably less, errors when using psychologically valid information elicitation procedures, but all the same they do make errors. The latter may be caused by the distraction of human attention, a person's fatigue, or other reasons. Errors are observed both in practice and in psychological experiments and any individual can make unavoidable errors from time to time. Hence, information obtained from a person must be subject to verification, rather than be used uncontrollably.

How, then can we check information provided by a person in constructing a personal decision rule for consistency?

The classification is consistent if the allocation of alternatives into decision classes does not contradict the relations between its estimations on ordinal criteria scales. In other words, if one alternative is better than the other according to the estimations (the estimations of first alternative are not worse than those of the other on all criteria and, at least on one criterion, an estimation is better), the first alternative must not be allocated to the worse class than second.

This condition is to be checked in the process of classification done by the decision-maker. In the absence of violation of this condition, the classification is a non-contradictory one.

Note that pinpointing a logical inconsistency must, in general, lead not to the automatic exclusion of an “error”, but to the creation of premises for a logical analysis of the basis for the construction of the decision rule.

2.5. Generation of explanations

From a behavioural point of view, one of the requirements of the application of any method for constructing a person decision rule is its explainability. For example, in making a crucial decision, a decision-maker would like to know why alternative A turned out better than B, and both of them are better than C. This decision maker's requirement is quite reasonable. In the process of constructing a personal decision rule, the stage of eliciting information from the decision-maker and the stage of presenting the final results are separated by a stage of information transformation. Understandably, the decision-maker wants to be sure that it is precisely his or her own preferences, without any distortions, that are behind the assessment of alternatives. In order to meet this requirement, the decision method must be "transparent": it must be conducive to finding an unambiguous correspondence between the information elicited from the decision-maker and the final evaluations of alternatives. Only then can there appear to be an opportunity for the decision-maker to obtain convincing explanations.

In the case of multicriteria classification, the explanations could be performed on the basis of the decisions made in the process of constructing of the complete classification. In the other words, the computer takes the decision-maker's decision directly related to the question posed by the decision-maker and informs him/her about the cause of the interrelation between alternatives.

2.6. Educative procedures

It is unreasonable to expect that the information needed for evaluation of alternatives through verbal decision analysis is simply lying around in decision maker's head waiting to be elicited (Humphreys and McFadden, 1980). That is why it is necessary to give to a decision-maker the possibility of gradual development of the policy in a problem of choice. A method should allow the decision-maker to make errors and correct them in a way that restores consistency of his or her estimates (either by changing preferences between estimates or by restructuring the criteria on which the estimates are made), to find some intermediate decisions and go further.

The methods of verbal decision analysis provide exactly this possibility to the decision-maker. In the stage where the decision-maker's preferences are elicited, the process employed is one in which the preferences are developed gradually. The decision-maker may make some contradictions, the method discovers them and gives the decision-maker the possibility to make an analysis of the reasons behind the contradictions and thus to find some compromises or changes which resolve them.

In the version of the method that we describe in this paper, the decision-maker is supported by being able to explore multimedia representations of alternatives that receive conflicting verbal descriptions and preferences. Thus the decision-maker's verbal representation can be expressed in a way that is consistent with the decision-maker's basis for forming the preferences. In this way self-educative procedures are built into the process of verbal decision analysis and support.

3. THE 'ORCLASS' METHOD AND DECISION SUPPORT SYSTEM

For the solution of the multicriteria classification problem the method and decision support system known as ORCLASS (ORdinal CLASSification) has been developed (Larichev and Moshkovich, 1994). The method of ORCLASS has the following features:

- It allows the construction of a complete classification of all possible objects in a criteria space, via classification of only part of them directly by a decision-maker.

  It provides the possibility to detect and correct errors and inconsistencies in the decision-maker's judgements.
- It makes possible the analysis of the classification thus formed and its modification in a case of some changes.

3.1 Example of problem structure for verbal decision analysis

On the basis of a meaningful verbal description of the location choice problem given a tourist decision maker, it is possible to create the following structure of the problem:

1. The grade of hotel accommodation at the location (see above):
   1.1. Five crown.
   1.2. Four crown.
   1.3. Three crown.
   1.4. Two crown.
   1.5. One crown.
2. The environmental quality:
   2.1. A quiet place near a forest.
   2.2. A place at some distance from a forest but not near a main road.
   2.3. A place near a main road with much traffic.
3. The distance from the beach by car:
   3.1. Less than 10 min.
   3.2. About 20 min.
   3.3. More than 30 min.
4. The cost of staying at the location:
   4.1. The cost is significantly less than expected.
   4.2. The cost is usual for accommodation of this standard.
   4.3. The cost is much more than expected.

3.2. The main features of the ORCLASS system.

The decision support system ORCLASS has the following features (see Larichev, Moshkovich, 1994 for more details):

3.2.1 It presents on a computer's screen to the user the description of an object in natural language.

The example of a task, as presented by the ORCLASS system, for the decision maker is given below:

The location is described as follows:

- The accommodation is of 'three crown' standard
- The location is near a forest.
- The travelling time to the beach is 40 min.
- The cost is usual for accommodation of this standard.

You are to allocate this location to one from two categories:

1 It would be wonderful to visit the location.
2 It would be interesting but not essential to visit the location.

3.2.2. DSS ORCLASS selects, at every step of the user–computer dialogue, the most "informative "question.

If the decision-maker assigns a presented case (location) to a particular decision class, one could make the following conclusions from this decision:

- the locations dominated (in terms of criteria given above) by the presented one must be assigned to the classes no better than the presented location;
- The locations dominating the presented one must be assigned to the classes no worse than the presented location.

Thus, by one decision it is possible to classify (in an indirect way) many objects. At every step in the dialogue, the system selects for presentation the location whose assessment would result in the biggest expected number of indirectly classified locations.

In this way, the system allows the construction of the complete classification through posing to the decision-maker only a small number of questions. For example, for 1024 locations and 4 criteria, only 33 questions, on average, are needed to construct the complete classification.

3.2.3. The system compares each answer of the decision-maker with previous answers and checks for inconsistencies.
In the case of inconsistency the system demonstrates on the screen the contradictory answers and provides the possibility to analyse them. In this way it creates a 'learning' effect for the decision-maker. An example of such a step in the dialogue is given below:

Contradictory answers

The first location:
The accommodation is of three crowns standard.
The location is near a forest.
The travelling time to the beach is 40 min.
The cost is usual for accommodation of this standard.
This location you assessed as:
" It would be interesting but not essential to visit the location."
The second location:
The accommodation is of three crowns standard.
The location is at some distance from a forest but not near a main road.
The travelling time to the beach is 40 min.
The cost is usual for accommodation of this standard.
This location you assessed as:
"The location would be wonderful to visit."
But the first location is more preferable than second according to your description of the problem.

Please analyse the situation and change your answer.

3.3. Resolving contradictions in the answers

On presentation of evidence of apparently contradictory answers, as in the example above, the decision maker may opt to reclassify a location at a different level on an attribute (leaving the verbal descriptions of the level unchanged), or to assign a location to a different preference class, such that consistency is restored. Such actions match the classical view of "allowing the decision maker to correct an error", and ORCLASS provides this facility.
On the other hand, the decision-maker may sometimes resolve the contradiction by making a verbal analysis like the following:

"The first location is not more preferable than the second because, although it is near a forest, it is not near a lake; while the second location, although it is some distance from a forest but not near a main road, is also close to a lake".

In traditional multi-attribute utility structuring of decision problems, the solution here is to add another attribute ("near a lake" – to – "far from a lake") and rate all the alternatives on this (Humphreys and McFadden, 1980, Keeney and Raiffa, 1986). But an important feature of the ORCLASS method is that not all alternatives have to be rated before they can be classified. There is nothing that requires that we have to add another simple attribute, increasing the dimensionality of the preference space when we work, in verbal decision analysis, with ordinal levels on criteria which can each be semantically quite complex. The requirement for a criterion is not unidimensionality as for MAUT, but only that we can form a preference ordering. Hence the criteria employed in Verbal Decision Analysis address semantic domains, not semantic

dimensions, and the complexity of the domains can be increased by using more or more richly described levels on a criterion, rather than by increasing the number of criteria. In the example, all that is required is that the decision-maker can order (unambiguously) the four descriptions:

- A location near a forest and near a lake.
- A location at some distance from a forest but near a lake and not near a main road.
- A location near a forest but not near a lake.
- A location at some distance from a forest and not near a lake, but not near a main road.

To help the decision-maker in the ordering of the second and third of the above descriptions, the multimedia descriptions of several alternatives having such features can be shown to the tourist decision-maker.
The decision-maker should understand that he or she is not just modifying the description of a single alternative at this point. Rather, the decision-maker is using what has been revealed to him or her about his or her preferences for alternatives *in general* through viewing particular multimedia, i.e., that he or she likes alternatives that are near lakes (among other things). This is now to be incorporated (with his or her approval) into the decision-maker's preference system through the way the levels are described on the relevant criterion in developing the basis for classifying alternatives.
Hence, in the following we propose an extension to the standard ORCLASS procedure whereby the original two adjacent ordered levels on the criterion (a location near a forest; a location at some distance from a forest but not near a main road) would be replaced by these four levels in the case that the decision maker resolves a contradiction by introducing new distinguishing verbal information (near/not near a lake). The sequence of subsequent comparisons is then revised to take into account the additional levels and the pattern of preferences given by the decision- maker.
Of course, ORCLASS, in this extended procedure, also has to backtrack, as all comparisons of locations in which one of the original adjacent levels were specified for a compared location must be re-specified and re-presented to the decision maker. But only these locations must be re-specified and re-presented, the results of other previously made comparisons in the sequence still stand unaffected. So we may still end up making considerably fewer comparisons than the total number of alternatives to be classified, even when allowing the decision maker to re-specify the levels on a criterion during the comparison process.
In the case the L-size (capacity) of the problem space in the classification task becomes too big, from the point of view of human possibilities for handling information, the hierarchy of criteria could be used to reduce the size to a manageable level.
The initial description of all the alternatives corresponds to a profile of pre-defined levels on the criteria (as in the standard ORCLASS procedure). These are "standard descriptions" (i.e., the sort of descriptions which would be important in general in determining choices by the average tourist visiting the island). But a particular tourist decision-maker can modify the verbal description of a compared alternative (i.e., adding the fact "that it is near a lake" because being near a lake is important to him or her in particular, though it may not be so to tourists in general) and that he or she has discovered (and abstracted) this verbally described characteristic of the alternative through viewing its multimedia description.
Of course, by adding new factors in the description of alternatives within the problem space, the decision-maker must take into consideration the necessity to have the corresponding information available about the alternatives. But usually the information, which can be provided about locations (alternatives) by travel agents and tourist bureaux, often in multimedia form, is much richer than the information used by tourist decision-maker in the preliminary selection stage.

3.4 Presentation of results to the decision-maker.

After the construction of a complete classification, the system can present to the decision-maker on-screen the most and least preferable vectors in each decision class. These are expressed in terms of the verbally described level on each criterion which marks the boundary. Such vectors create the boundaries for a decision class. The decision-maker can analyse the boundaries and make necessary corrections. The system supports this analysis by providing the possibility for the decision-maker to obtain an explanation of every classification decision in natural language and on the basis of information given by decision-maker during the process of the construction of classification.

4. THE SUBSEQUENT INVESTIGATION OF ALTERNATIVES OF THE BEST CLASS

The application of the ORCLASS system allows one to select alternatives of the best decision class*: "it would be wonderful to visit the location"*. In the case where we have a moderate number of locations to visit (say 2-8) then we can present comparisons between alternatives expressed in both verbal form, and multimedia form (i.e. as in a guide or gazetteer on DVD or on CD-ROM). The multimedia form is of course much richer in potential information than the verbal description, but much of this potential information may be irrelevant in controlling the choice between alternatives for the particular decision-maker.

If on the other hand, it is necessary to enquire further about an alternative, the information required should be easily provided by the decision-maker on viewing the multimedia information (on the CD-ROM) about that alternative. Moreover, in this case, the process of obtaining this information is likely to be viewed as enjoyable rather than "a chore" by the decision-maker.

In the case that the number of locations to visit, as initially classified, turns out to be too many, the decision-maker can use the ORCLASS system again, this time posing more strict requirements for classification of alternatives into the best class.

5. PRACTICAL IMPLEMENTATION OF MULTIMEDIA SUPPORT FOR THE EXTENDED ORCLASS SYSTEM

In a practical implementation of this extended ORCLASS procedure, linked to an interactive multimedia information presentation system (which could be distributed to travel agents, tourist bureaux, or even directly to individual tourist decision makers requesting it), the system could visually tag each location described in a "multimedia gazetteer" with the class into which it was classified by the particular decision-maker. A (pop-up) verbal description would also be added to each location that would be consistent with its current profile description in the classification (i.e., it would be composed out of phases which define levels on criteria in the current, personally developed classification scheme). We are currently implementing a pilot Gazetteer for locations in the island of La Gomera, following this specification.

6. CONCLUSION

Nowadays there is an increasing effort in computer technology to develop effective decision support tools helping people to make better decisions. Such tools need to interact with the decision-maker in his or her own language, to notice inconsistencies in his or her judgements, and to provide explanation and advice in the same language. Decision support systems based on Verbal Decision Analysis possess these required features. They create user-friendly decision environments.

A second growth tendency in computer technology consists in the presentation of the information in multimedia form. This kind of presentation gives to the decision-maker the possibility to enrich the perception of alternatives under consideration.

The goal of this paper has been to demonstrate the possibility to combine these two tendencies, indicating a way to develop new generation decision support systems adapted to human possibilities and limitations, working with the decision maker, in the way that people actually analyse and observe alternatives in order to make the best possible choice.

From our point of view, a method, like ORCLASS, using natural language description of problems through all steps of the analysis and employing psychologically valid procedures, and sometimes multimedia support as well, has the best chance for success in practical decision making applications like that described above which are faced all the time by millions of today's tourists.

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