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ABSTRACT

The use of performance objectives in vocational agriculture is put into perspective with two assumptions. First, in formulating performance objectives, the teacher must consider the program objectives, the characteristics of the students, and the teaching resources of the community. Second, the diversity of interests, abilities, and other characteristics of teachers preclude the uniformity of general prescriptions for all teachers. The definition of the concept of a performance objective, its basis and origins (employability of students, task analysis, and goal statements), and special considerations in formulating objectives are defined. Presentations in the affective domain (attitudes and values), differences between performance objectives and other objectives, and performance objectives in the vocational agriculture field that encompass the utilization of community resources and problem-solving techniques are examined. A selected bibliography on instructional objectives completes the document. (JB)

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PERFORMANCE OBJECTIVES
IN THE
TEACHING OF VOCATIONAL AGRICULTURE

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TEACHING OF VOCATIONAL AGRICULTURE

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FOREWORD

The questions which teachers of vocational agriculture have raised about performance objectives have been neither more nor less than the questions they have raised about other recent additions to the terminology and concepts of professional educators. Basically, the questions have been asked to seek information, understanding and clarification of relationships.

However, seldom has anyone given as direct attention to those questions as has been given by Dr. Raymond A. Garner in this publication. The language and the examples provided for the reader have come directly from the field of vocational agriculture. A group of Michigan teachers of vocational agriculture contributed to this publication through their discussions in a workshop at Michigan State University during the summer of 1973.

The content of this publication may be put into a particular perspective through the stating of two assumptions which appear to me to be essential for understanding of the stated concepts:

1. The teacher of vocational agriculture, when deciding upon appropriate performance objectives, will consider (a) the program objectives, (b) the characteristics of the students, and (c) the teaching resources of the community.
2. The varied interests, abilities, and other characteristics of teachers of vocational agriculture along with community differences preclude the advisability of making general prescriptions for all teachers about the use of performance objectives.

Teachers of vocational agriculture will, I believe, find this publication useful as they think through the meaning of performance objectives. It should contribute to more effective teaching.

O. Donald Meaders, Professor
Coordinator of Agribusiness and
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CONTENTS

What is a performance objective?	1
How are performance objectives derived?	4
What are some special considerations when writing performance objectives?	5
Is it possible to teach attitudes and values?	10
How are performance objectives different from other objectives?	14
Are performance objectives new to vocational agriculture?	15

WHAT IS A PERFORMANCE OBJECTIVE?

Simply stated, a performance objective answers three questions:

1. What is the student able to do after instruction?
2. Under what conditions?
3. How well?

Let's see how these questions might be answered while writing a performance objective centered on a practical problem related to soil testing. It is a common practice to teach students what they need to know in order to gather soil samples to test for lime and fertilizer recommendations. In this situation, the answer to the first question-- what the students will be able to do after instruction--could be stated as follows:

(A) The students will be able to gather soil samples

While this goal clearly reveals the intent of the instruction, it doesn't answer the second question because the setting, conditions or the specifications under which the learning would take place are not indicated. For instance, it should give greater meaning and purpose to the instruction when it is known that the students need the soil tests to carry out individual projects at home or to implement a group project on the school land laboratory. It should also facilitate planning and instruction to know the sampling tools and equipment, as well as any other materials of instruction, which should be available.

In order to indicate the conditions under which the learning takes place, the instructional goal above (A) might be modified to read:

- (B) *Confronted with the problem of sampling soils to test for lime and fertilizer recommendations to be used by students to carry out individual projects at home or to implement a group project on the school land laboratory and given 12-quart pails, round pointed shovels or spades with trowels or garden dibbles, soil augers or sampling probes, containers for samples, and sampling information sheets, the students will be able to gather soil samples.*

The instructional intent and the conditions under which the learning would occur have now been pointed out but an answer to the question of how the students are expected to perform has not been indicated. Criteria for describing an acceptable performance should be observable. One method for determining acceptability is to observe if student performance is consistent with recommended practice. In the case of soil sampling, standard procedures are available which, if followed by students, should insure that they would be able to secure a representative composite soil sample for each area to be tested. The question, then, of how well the students had sampled soil could be answered by adding criteria of successful performance to the instructional goal indicated above (B) to complete a performance objective.

- (C) *Confronted with the problem of sampling soils to test for lime and fertilizer recommendations to be used by students to carry out individual projects at home or to implement a group project on the school land laboratory and given 12-quart pails, round pointed shovels or spades with trowels or garden dibbles, soil augers or sampling probes, containers for samples and sampling information sheets, the students will be able to gather soil samples so well that the land to be tested was divided into sampling areas according to differences in its productivity, topography, texture, drainage, color of top soil and past management and a composite sample was prepared by collecting two soil samplings or cores for each of the areas to be tested.*

In summary, the illustration on soil sampling should have brought out that a performance objective includes three essential components:

1. What the learner will be able to do
2. Under what conditions he will perform
3. How well he will be expected to perform

HOW ARE PERFORMANCE OBJECTIVES DERIVED?

Employability a major curriculum focus. Helping students become employable is a major focus of secondary vocational education. While all instruction in vocational agriculture may not help students to gain job entry immediately, it should contribute to occupational preparation. In fact, much of the education in vocational agriculture is designed to promote occupational development rather than specific job preparation.

For example, a student may draw upon what he learned while enrolled in high school vocational horticulture and the related cooperative occupational experience to secure regular employment in some field of ornamental horticulture. Or he could take additional postsecondary education in vocational-technical study to qualify for employment in such specialized areas of horticulture as floriculture, nursery operation, turf grass management, arboriculture, landscape horticulture and park and recreational land management. As another option he might build on his high school vocational horticulture to study horticulture in a college or university and eventually use this preparation to secure employment at the professional level.

On the other hand it should be emphasized that occupational development includes much more than the acquisition of job skills

and technical knowledge. In addition students must be helped to make realistic assessments of their interests, aptitudes and capacities, to settle finally on occupational preferences and then to take steps to implement these choices. Above all, the needs of the students must be kept foremost. Vocational development is not a process of fitting students to the occupational system. Rather the students should be helped to develop a breadth of experiences, knowledge and understandings about the world of work which they can draw upon while they establish themselves in occupations of their choice.

If a major purpose of vocational agriculture is to provide instruction which will help students to gain job entry and to advance in an agricultural occupation, a performance-based curriculum in vocational agriculture should be centered on what successful workers in agricultural occupations are expected to be able to do. Developing goal statements and making task analyses are two commonly used approaches for determining educational needs in agricultural occupations.

Making a task analysis. To conduct an occupational task analysis, it is necessary to find out what skills, understandings and attitudes are required for successful employment. This information is secured by extensive interviewing and observation of employers and employees. Worker tasks are then used as a frame of reference for writing performance objectives. If properly carried out, a task analysis provides a sound and realistic basis for preparing performance objectives. But this process may become very time consuming and expensive.

Preparing goal statements. Preparation of goal statements seems to be a more feasible basis for formulation of performance objectives in vocational agriculture. Under this procedure, teachers draw up broad goals of instruction in terms of what they believe workers should be able to do on the job. Each goal statement is then converted into one or more performance objectives. These objectives are reviewed by representative employer-employee groups. When necessary additions and deletions or other modifications have been made, they become the framework for a performance-based curriculum.

Whether curricular decisions are based on learner goals determined by making a task analysis or by preparing goal statements, either approach should result in an instructional program which is focused on preparing the student to enter the world of work.

WHAT ARE SOME SPECIAL CONSIDERATIONS WHEN
WRITING PERFORMANCE OBJECTIVES?

Indicating desired learner performances. Since performance objectives are student oriented rather than teacher oriented, it is essential that learner goals indicate as precisely as possible what the student will be able to do after instruction. When this intent is clearly stated, the student, the teacher and others will know what terminal learning outcomes are expected. To indicate desired student attainment, use action words (verbs) which convey fewer meanings

(Say) The student will be able to decide which animal to purchase.

OR

The student will be able to calibrate a sprayer.

Avoid words such as know, understand, or appreciate because

they are subject to many different interpretations.

(Don't say) The student will know the relationship between plant growth and soil productivity.

OR

The student will develop an appreciation of the importance of good work habits.

A group of teachers of vocational agriculture listed the following as illustrative of action words which might be used to reflect the development of rather specific understandings or skills in agriculture. It should be pointed out that neither list of words pertains exclusively to understandings or skills.

Verbs Used to Indicate Development of Understandings

Analyze	Describe	Identify	Plan
Calibrate	Detect	Illustrate	Predict
Calculate	Determine	Infer	Prepare
Collect	Develop	Interpret	Produce
Compare	Diagram	Itemize	Provide
Compute	Differentiate	Justify	Recognize
Contrast	Distinguish	List	Reorganize
Convert	Estimate	Locate	Retain
Criticize	Evaluate	Measure	Sample
Decide	Explain	Operate	Select
Demonstrate	Formulate	Organize	Solve
Design	Graph	Perform	Verify

Verbs Used to Indicate Development of Skills

Adjust	Eradicate	Lubricate	Spread
Assemble	Feed	Market	Sterilize
Balance	Fertilize	Overhaul	Store
Ball	Harvest	Plant	Test
Blend	Implant	Propagate	Train
Catalogue	Inoculate	Prune	Transcribe
Castrate	Inseminate	Record	Transplant
Clean	Insert	Remove	Treat
Construct	Inventory	Repair	Vaccinate
Dehorn	Insulate	Seed	Ventilate
Dissect	Label	Service	Water
Drench	Level	Spray	Weld

Stating conditions of learning. Once the desired student achievement has been expressed in terms of learner performance (what the

learner will be able to do) the instructional intent will be more clearly defined when the setting or conditions under which the learning is being demonstrated are known. Here are some illustrations:

1. Given the problem of preparing a window display in a local agricultural business, the students will be able to . . .
2. Given a service manual, a standard set of tools and a malfunctioning internal combustion engine, the student will be able to . . .
3. Given the problem of deciding when to market the soy beans produced on the school farm, the students will be able to . . .

It seems to be a rather common practice to state the learning conditions, specifications or problems as a given. Sometimes it may be desirable to place certain restrictions on the learner as in the following example.

Working individually and without the use of notes and references, the student will be able to . . .

Here are two other suggestions for describing the learning situation:

1. List only those visual aids, supplies and special equipment which are critical for successful performance; omit materials which can be assumed to be on hand (paper, pencils, etc.)
2. When the same set of learning conditions apply to successive learner performances, list the learning conditions as a stem statement and follow with a list of the related performances.

Determining the criteria of performance. In determining the criteria of acceptable performance, or how well the student is expected to perform, teachers of vocational agriculture may use a variety of evaluative techniques. They are able to observe their students and evaluate them not only in the classroom and shop but also as they help them learn in less formal settings. Teachers of vocational agriculture use written tests and examinations, for instance, but more often they

will measure achievement by the accomplishments of their students while they carry on individual and group learning activities in the community.

The following performance objectives include criteria of acceptable performance which seem particularly appropriate for students of vocational agriculture.

a. Standards of productive efficiency.

... student will be able to produce pigs so well that there will be at least 8 pigs per litter raised to weaning at 5 weeks. The pigs will average at least 3 pounds at birth and 14 pounds at 21 days. If fed out as market hogs, they will average at least 220 pounds if sold by the time they are 165 days old.

b. Standards cooperatively agreed upon by students and teacher.

... students will be able to plant pine seedlings so well that on inspection the seedlings will stand at the same level as in the nursery, the roots will occupy a natural uncurled position in the soil, there will be no air pockets around the roots, and there will be at least 90 per cent livability at the end of the second growing season.

c. Standards derived from the performance of competent workers.

...students in the FFA corn project will grow corn yielding within 15 per cent of the average yields of five community corn growers who are judged to be superior corn producers.

d. Standards consistent with authoritative references

... students will be able to operate tractors using standards of safety consistent with procedures prescribed in Safe Tractor and Farm Machinery Operation.

e. Standards which are self-evident

... students will be able to establish a lawn by seeding so well that the grass will be uniformly dense and nearly weed-free after one year of growth.

Here are some additional approaches for indicating acceptable performance.

a. Specify a time limit.

... the student will be able to remove, inspect, clean, regap and replace a spark plug in ten minutes.

Time is certainly an important consideration in assessing performance, especially in work situations which require an expeditious effort in order to secure and retain employment. No one wants to pay for unnecessary labor because a workman performed so inefficiently.

On the other hand, the saving of time is of less concern than the quality of the workmanship. If work is done well and within a reasonable period of time, most persons will be satisfied. Actually, it is not necessary to impose a time limit for the accomplishment of many tasks. Most management decisions, for instance, are made after thoughtful and deliberate consideration. If time is a critical element in successful work performance, then a time limit should be specified when stating a criterion. But if a time limit is established, it seems well to include other specifications when writing performance objectives, since rate of performance alone does not insure a quality performance.

b. Specify minimum successful performance.

... the student will be able to identify the trees in local farm woodlots with 80 per cent accuracy.

Below are some other ways to indicate a minimum successful performance.

Specify a range of correct response -- .030" \pm .010"

Specify a minimum score on a written examination -- 85 per cent

Of all the tasks involved in writing performance objectives none is more demanding than the task of formulating criteria which clearly reveal to both the student and the teacher how well learning has taken

place. Yet the prospect of a student performing at a level of attainment which he has set for himself while working under the guidance of his teacher, can be a powerful and positive influence on the student's accomplishment. When the performance as well as the level at which it is to be achieved are clear, the student should be more strongly motivated to learn and his teacher should be in a better position to help him learn. Even though it becomes difficult to define an acceptable level of performance, this limitation should not cause one to abandon a desired performance objective. The fact that the objective is recognized as worthy by both student and teacher should facilitate its achievement at a desirable level of acceptability.

IS IT POSSIBLE TO TEACH ATTITUDES AND VALUES?

All of the illustrations used so far in this presentation have referred to learning in either the psychomotor (skills) or the cognitive (knowledge, understandings) domains. Nothing has been said about learning in the affective (attitudes, values) domain.

With rare exceptions, people rather generally agree that schools have a responsibility to help students acquire desirable attitudes. Major statements on the purposes of education invariably include affective aims. Employers have regularly emphasized the need for students to develop favorable work attitudes. Attitudes and values are stressed in the FFA. For example, the primary aim of the FFA is the development of agricultural leadership, cooperation, and citizenship. Other youth organizations strive for similar praiseworthy outcomes.

The statements on attitudes and values, which appear below, suggest some of the problems which one encounters when teaching in the affective area.

1. Attitudes and values are difficult to define; they are subject to multiple meanings; as abstract terms, they are often defined with equally abstract terms.

What is meant by such terms as loyalty, adaptability, and thoroughness? While defining them is one prone to use terms which are equally abstract, e.g. loyalty means fidelity means devotion means allegiance means loyalty?

2. An attitude gains meaning when one describes the behavior which a person would manifest when he exhibits the attitude.

Friendly begins to acquire meaning when someone comments, "He smiles and says good morning to everyone."

3. Different people may attach different meanings to the same attitude.

Teacher A concludes that Fred is responsible because he volunteers to feed and water the FFA livestock, which he does regularly each weekend.

Teacher B concludes that Fred is responsible because he abides by rules of classroom conduct.

4. When a different attitude is manifested by a change in behavior, it may be difficult to isolate the change agent.

Ted had refused to carry out any activity which required that he stand before a group. At the end of his junior year in high school he was elected FFA president. Without hesitation he assumed all presidential duties including appearances before school assemblies and several public meetings. Who was the change agent?

Quite obviously, attitude development is a complex process and, as some maintain, attitudes might possibly be caught rather than taught. Nonetheless, it seems reasonable to assume that considerable attitude development is taking place while students are enrolled in high school even though it may be difficult to determine when and how it is occurring.

If attitudes or values can be systematically taught, it would seem that a logical first step would be to decide what the desired attitudes

or values mean. Since they may have such different and varied meanings, it also seems necessary that any meanings attributed to the attitudes or values be those that are agreed upon by the students, teachers and others who are going to be using them.

By adapting a technique developed by Mager¹, a graduate class of teachers of vocational agriculture explored the possibility of indicating in behavioral terms the meaning of dependability, one of twelve personal traits² judged by employers to be essential for success on the job. After the class divided into three smaller groups, each group was asked to list what a student on cooperative placement in a local agricultural business might be doing to indicate that he was dependable. Below are the three lists of behaviors which were compiled after about 20 minutes of brainstorming.

Group 1

- x On time
- x Forms filled out on time
- x Prompt to meetings
- Minimum of complaints
- ? Accepts job assignments
- ? Informs supervisor of problems
- Aggressive performer
- x Completes duties on time
- ? Leadership positions in community
- x Available for extra duties
- Accepts responsibilities willingly
- x Gives proper notices of absences

Group 2

- x On time
- Carries out instructions
- x Puts tools away
- ? Does not cover up mistakes
- ? Sees what needs to be done
- Performs physical demands of job
- x Can work without constant supervision
- x Finishes all assigned tasks
- Finishes all tasks even in conflict with personal wishes

¹ Robert F. Mager, Goal Analysis, Belmont, California: Fearon Publishers/Lear Siegler, Inc., 1972. pp. vi+132.

² Other personal traits: enthusiasm, honesty, initiative, sense of humor, loyalty, tact and courtesy, industry and ambition, friendliness, cheerfulness, sense of fair play, cooperative attitude.

Group 3

- x On time
- x Shows up when scheduled
- x Follows instructions
- Consistent performer
- ? Makes wise use of time between assigned tasks
- Does what he says he will do
- x Completes assigned tasks and within allotted time

Later the teachers examined the items in each list and designated with an (x) those which were judged to reveal an observable response. When the teachers were uncertain whether an item represented an observable behavior, they marked it with a question mark (?). After considerable sorting, deletion of unwanted items and the addition of some new ones, the behaviors were regrouped and formulated into the following performance objectives.

Given placement through a cooperative occupational education program in a local agricultural business, the student will be dependable by:

1. Demonstrating that he is punctual
 - a. Reports to work on time
 - b. Reports promptly to work assignments and begins to work without wasting time.
 - c. Returns promptly after completing assignments away from his principal work location
 - d. Keeps required records and reports up to date
2. Cooperating closely with his supervisors
 - a. Follows instructions
 - b. Asks for help when he needs it
 - c. Notifies supervisor when he must be absent
 - d. Works just as hard when his supervisor is away
3. Carrying on a consistently good work performance
 - a. Finishes all assigned tasks
 - b. Finds things to do when assigned tasks are completed

- c. Keeps his work area neat and orderly. Puts things away after using them.
- d. Refuses to turn out shoddy work; corrects mistakes or notifies his supervisor

Would the procedures outlined in this section be useful to teachers of vocational agriculture? Possibly. The following are suggested as approaches for converting attitudes and values into meaningful student behaviors.

1. Through classroom, small-group and individualized instruction, provide opportunities for students to decide what important attitudes and values mean to them. Try to relate this study to problem situations-- attitudes to be demonstrated in the classroom, around the school, at work, on field trips, at social events.
2. Numerous references are made to attitudes and values in the FFA. During chapter meetings and incommittee work, members might want to clarify them more fully as specific performances to be achieved through the FFA program of activities.
3. Students on occupational placement should be especially interested in finding out what work attitudes their employers expect of them. The students might develop their own perceptions of desirable work attitudes and then arrangements might be made to have them reviewed and supplemented by employer advisory groups.

The teaching of attitudes and values has always been implicit in our instructional programs. Perhaps more can be done to make the process explicit.

HOW IS A PERFORMANCE OBJECTIVE DIFFERENT FROM OTHER OBJECTIVES?

Other terms which may have a meaning similar to performance objectives are behavioral objectives, measurable objectives or operational objectives. All of these terms are alike in that they reveal an intent to bring about changes in the learner. In other words the focus in

these objectives is on what happens to the learner rather than on what the teacher does to influence learner outcomes, important as that may be. Instead of teacher-oriented objective (the teacher will develop the ability to formulate a ration) the objective would be student-oriented (the learner will be able to formulate a ration).

Even though writers of performance, behavioral, measurable or operational objectives rather uniformly focus on learner outcomes, they vary considerably within each category in the degree that they state, either the conditions of learning or the criteria to be used to measure the extent of learning. It should be recognized, however, that the model of performance objective which is evolving in Michigan indicates desired learner outcomes as well as the conditions and the criteria of learning.

There is also some variation in the meanings of other terms which may be used when a performance-based curriculum is considered. For this reason, communication will probably be facilitated if terms are defined before considering what others are writing or saying about a performance-oriented curriculum.

ARE PERFORMANCE OBJECTIVES NEW TO VOCATIONAL AGRICULTURE?

Successful teachers of vocational agriculture should have no difficulty in adapting to the current emphasis on developing and implementing a performance-based curriculum. In fact, most teachers will probably continue to use instructional strategies, such as the following, which have proved so successful over the years.

Carrying the learning process through the doing stage. Carrying learning through the doing level has always been a cornerstone of

instructional programs in vocational agriculture. The effectiveness of the teachers is regularly evaluated in terms of how well their students are able to cope with the many practical problems which they encounter as they carry out their individual and group learning projects. When students enroll in vocational agriculture they expect that the instruction will proceed well beyond the acquisition of knowledge and understanding. They want an instructional program which includes learning outside the classroom. They anticipate that they will have numerous opportunities to carry the learning process through the doing stage.

Using school and community resources to enhance learning. Like many other teachers, instructors of vocational agriculture have regularly employed learning techniques and devices such as class demonstrations, field trips, laboratory activities, use of resource persons, and a variety of visual or other teaching aids. In addition, teachers of vocational agriculture have found that supervised experience programs provide a powerful motivating influence, whether conducted through student-owned or student-managed projects or through supervised occupational placement in an agricultural business. To supplement the learning opportunities provided by individual programs of supervised experience, more and more teachers are developing FFA or other student-sponsored group activities such as land laboratories, school farms, and cooperative livestock projects.

Basing instruction on finding and solving problems. Basing instruction on real problems which students identify and solve while working under the guidance of the teachers, has been another cornerstone of instruction in vocational agriculture. Essentially, this

approach is one of "teaching students something so they can do something." It involves helping students recognize problems, guiding them to gather facts and evidence to support alternative solutions, helping them decide which solution to adopt and, finally, assisting them to implement the solution. Students have been helped to recognize and solve a gamut of problems, ranging all the way from helping one of them decide which animal to buy for a livestock project to assisting another in deciding how he could best present himself to a prospective employer in an agricultural business.

What modifications are likely to be made in the basic curriculum in vocational agriculture as the result of implementing a performance-based instructional program in Michigan? If a teacher has kept in touch with the occupational training needs in vocational agriculture and has adjusted the curriculum accordingly, only minor changes may be necessary.

Probably, one of the greatest benefits accruing to the profession stems from the process of self-examination which Michigan teachers are undergoing as they develop and implement a performance-oriented curriculum. This screening and winnowing out process, which is taking place while writing committees of teachers work with reviewing committees from agribusiness, should result in sets of performance objectives which are oriented not only to the occupational education needs of students but also to the practical realities of carrying out a significant instructional program at the local school level.

Which sets of recommended performance objectives will be included in the local school curriculum? This question should be answered rather easily if teachers and administrators, while working with local

advisory committees, have already decided which occupational preparation areas are to be included in the local school curriculum.

By the time that the sets of recommended performance objectives have been disseminated to local schools for possible adoption, local educational personnel will have prepared goal statements for each occupational preparation area to indicate anticipated educational outcomes. These goal statements can be used to measure the adequacy of a set of performance objectives for meeting local needs. When deciding whether to adopt a set of performance objectives, it should be kept in mind that they represent a minimum list. A local school instructional program may include more than the recommended minimum acceptable performance objectives. It should also be remembered that local educational personnel may decide that the minimum acceptable performance objectives are not satisfactory and proceed to develop an alternative set of equal or greater quality.

Implementation of performance-based curricula in vocational agriculture shows promise of becoming a highly significant development in Michigan although it should be recognized that some critics contend that the use of performance objectives denies the students an opportunity to formulate purposes, to make personal choices and to initiate action to achieve what they desire to accomplish. Such could be the result if teachers confined their instruction to the mastery of content in the classroom. But as long as teachers continue to provide relevant instruction in settings which permit students to use their creative talents in the solution of problems which are vital to them, a performance based curriculum should not become a restrictive influence on student development.

In the future, then, as it has been in the past, the student should be central in any instructional program in vocational agriculture.

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