Behavior Change Theories and Techniques

Linking environmental management with behavior change goals requires an understanding of how to apply behavior-change theories and techniques. This resource offers an introduction to behavior change designed to guide educator planning. Educators can decide what to learn about people, how to select indicators of change, and how to use audience information to create change.

The ideas included in *Behavior Change Theories and Techniques* are subtle and complex; they provide an overview of the following topics:

  I.   Changing behavior – One behavior and one audience at a time
 II.   Why do people change their behavior?
III.   Using social assessment techniques to identify target outreach behaviors
 IV.   Choosing what to assess
  V.   Creating change

After reviewing this introduction, you may want to investigate further on your own. Details about theories introduced in this document are summarized in Tables I (p. 19) and II (p. 25). Figure 11 (p. 17) provides a diagram that integrates the theories, elaborating on an Integrative Model developed by Fishbein and Cappella (2006). Table III (p. 31) provides an example for how to connect survey questions and behavior change theories. The Changing Public Behavior project also provides a worksheet to help educators apply behavior change theories as part of their planning effort, available on the Water Outreach Web site (UW ERC, 2007).

I. Changing behavior – One behavior and one audience at a time

Environmental outreach initiatives can only be truly successful if they change those characteristics of individuals or groups that are contributing to an environmental management problem. If your goal is to change human behaviors, you need to develop an understanding of the qualities and characteristics of the individuals and communities with which you work, and how those characteristics might impact the situation. This is known as the *social or human dimension* of environmental management.

When you study the role of people in your situation, focus on behaviors in reference to a *particular* place, time, and community. This may include investigating relevant influences from each of four, broad, interrelating categories: sociocultural, economic, political, and historical. At

first glance this may sound overwhelming; it is, however, somewhat simplified in practice by focusing on one or more *target* audiences for an outreach initiative.

Encouraging a change in behavior requires emphasizing *a specific behavior* to be accomplished by *a specific audience*. A *target audience* is a *segment* of the population with potential to effect the desired change; a segment that is likely to be affected by the change; or both. The value of targeting an audience lies in: 1) identifying the particular benefits of and barriers to the preferred, as well as the competing behaviors, for the specific audience; and 2) optimizing the message and method to accomplish the educational objective (Stevens & Andrews, 2006).

As you consider a behavior change initiative, work with a team of experts and audience representatives to:

- Implement a planning process
- Consider a strategy for change (decide if your goal is short-term vs. long-term change)
- Collect and analyze information about the target audience
- Choose one or more techniques with the potential to be effective with the target audience
- Monitor and evaluate the intervention

II. Why do people change their behavior?

A. Understanding people's intention to act and resulting behaviors

People have been trying to figure out how to change each other's behavior probably since "the dawn of time". Documented approaches that began to gain wide acceptability developed with the growth of psychotherapy. In recent decades, research about how to improve communication about health recommendations has driven theory development and testing. This section builds on this extensive history to describe the basic theoretical elements and to show how they connect to the work of educators (Figure 1). How to apply these theories is addressed in sections III and IV.

At the end of this resource, there are several tables providing additional detail. *Table I. Changing Behavior – Theories* (p. 19) provides a brief description of the theories listed in Figure 1. *Table II. Changing Behavior – Techniques* (p. 25) provides a brief summary of well-accepted approaches to changing behavior.

B. Behavior change theory

Behavior change theory suggests that there are three significant factors to consider when investigating the *likelihood* that a person will perform a behavior (intention to perform):

1. A person's beliefs about a behavior (attitudes)
2. A person's belief about what others believe about that behavior (social norms)
3. A person's belief about his or her own ability to perform a behavior (behavioral control)

These beliefs, when accompanied by the practical reality of a person's situation — such as their past behavior, the surrounding demographics and culture, their personality, their individual characteristics, their skills, and the context — determine the person's intention to change their behavior. In this model, known as the Theory of Planned Behavior, a person's *intention* to perform a behavior is thought to be more likely to predict a person's behavior than any other element. Figure 2 illustrates the basic elements of a behavior change model.

In the Theory of Behavior Change, "attitudes" refers to a person's beliefs about and attitude toward **a specific behavior**. For example, what does the person believe about contaminated drinking water, what do they believe about the likelihood of spilled pesticides leaching into groundwater, and what are their attitudes about contaminating drinking water with pesticides?

Accepted beliefs (norms) about a behavior, and beliefs about how much pressure the individual will experience from others to comply with a certain behavioral expectation, are known as beliefs about *social norms*. For example, what does the person think that their neighbor believes about contaminated drinking water, and do they believe that their neighbor would approve or disapprove or even notice if their careless behavior resulted in pesticides leaching into groundwater near a well?

Control beliefs and *perceived ability to control* refers to a person's belief about whether their behavior will make a difference and whether they have the skills to apply a behavior. For example, does the person think it's possible to avoid contaminating groundwater with pesticides, and do they think that they have the skills or resources to keep the pesticides from contaminating the groundwater near a well?

 (Ajzen & Fishbein, 2005).

Figure 1. Behavior change: Theories and techniques	
Behavior Change Theories (Details in Table I, p. 19)	Techniques for Changing Behavior (Details in Table II, p. 25)
An integrative model of behavior	*Community/group organization and development*
Cognitive dissonance theory	*Education as a transformational activity*
Diffusion of innovation	*Social marketing*
Social cognitive theory	*Transformational education*
Stages of change theory	
Theory of reasoned action	
Theory of planned behavior	
Value-Belief-Norm theory	

Figure 2. Theory of planned behavior (Ajzen & Fishbein, 2005)
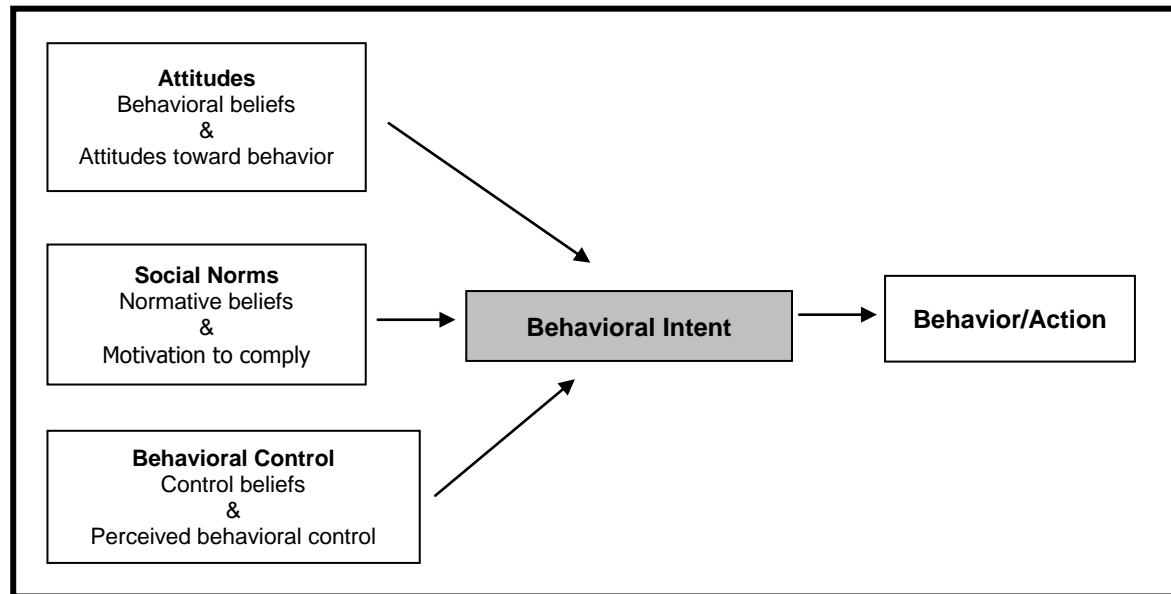
An Integrative Model of Behavior

To summarize theories helpful for communicators and educators, Fishbein & Cappella expanded on the Theory of Planned Behavior to incorporate additional information known to be important in changing behavior and called their revised model the *Integrative Model of Behavior* (2006, p. S2). In this model the authors emphasize that, "Any given behavior is most likely to occur if one has a strong intention to perform the behavior, has the necessary skills and abilities required to perform the behavior, and there are no environmental or other constraints to prevent behavioral performance".

The Integrative Model incorporates a reminder of the dynamic quality of a person's behavior. The model identifies background influences — such as past behavior, culture, personality, emotion, and past exposure to an idea — as significant to the formation of a person's beliefs about a behavior, beliefs about the beliefs of others, and beliefs about their ability to perform the behavior. It also recognizes that environmental factors, the person's skills, and the person's abilities affect whether the person's intention to act is transformed into action.

Figure 11 (p. 17) provides a diagram of the integrated model illustrating these points and adding descriptive details from contributing behavior change theories.

Applying the theories and models

An educator could learn a lot about the likelihood of a person performing a behavior by applying these theories in questions to targeted individuals, such as those questions outlined in Figure 3. And is the current behavior *habitual* or a conscious choice? And where does the behavior fall in the cycle of a person's life? The answer to these questions provides more clues about how hard it might be for an individual to change his or her behavior.

Ask questions like these to figure out the likelihood of a person performing a behavior:

- Does the person have *the intention* to perform the behavior?

  o What does the individual believe about the specific behavior?

  o What does the individual believe about his or her ability to perform the behavior?

  o What do other people believe about the behavior? And do they perform it?

  o What does the individual think that other people think?

- Does the person have the necessary skills and abilities required to perform the behavior?

- Are there any environmental factors or constraints that support or discourage performing the behavior?

A hierarchy of behaviors

When considering behavior possibilities and causes, it is helpful to remember that a person's current behavior may be purposeful, or it may be habitual and less easily changed. Educators can begin their analysis by identifying where the recommended behavior is likely to fit in a hierarchy (Figure 4). Educators are most likely to focus on changing *learned behaviors*. Of these, efforts to change habits and routines (termed *post-conscious behavior* in Figure 4) are likely to involve different techniques than those designed to suggest or modify a new behavior (*conscious behavior*). Helping individuals to develop new habits or routines may take more effort than a focus on changing a single behavior, but that extra effort could have long-term or sustainable effects on environmental management.

Timing

Timing in a person's life is another important component of behavior change (Shaw, forthcoming). Where is the individual in a continuum of change, for example? Is the person imagining the new behavior but not yet ready to take action? Are they preparing for the new action? Do they need support to keep doing the right thing? Or have they already tried the recommended behavior, but stopped performing it? Another quality that might prove to be important in targeting approaches for an outreach initiative is to decide whether the person is an early adopter or laggard or someone in between when it comes to adopting an innovation (Rogers, 2003).

Understanding the likelihood that an individual will change requires some understanding of each of these elements.

- Reflexive behaviors (Example: pulling your hand away from a hot object)

- Intuitive behaviors (Example: catching a falling child)

- ***Learned behaviors***

  o Conscious behaviors (Example: deciding to go to a movie suggested by a friend even though you don't think you will enjoy it)

  o Post-conscious behaviors

    ▪ Patterns and routines (Example: taking a shower before breakfast)

    ▪ Sequences of habits (Example: steps involved in driving a car)

Beliefs about control and power

Another important element underlying a person's intention or actual change in behavior is a person's belief in his or herself, and in his or her ability to do something. *Self-efficacy* is the conviction that one can successfully execute the required behavior. *Self-efficacy beliefs* refer to a person's judgment of his or her own capabilities to organize and execute a course of action required to attain a designated performance. For instance, am I capable of calibrating my fertilizer spreader correctly? Can I accomplish all the steps necessary to collect a soil sample for testing?

According to *Social Cognitive Theory*, a person is not like a machine, responding automatically to a specific input. People have the capability to symbolize, self-regulate, and self-reflect (Bandura, 1986 and 1997). A person is able to react flexibly to a dynamic environment and able to apply internal values and goals to any particular situation (Figure 5).

Self-efficacy beliefs influence choices that people make, how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations. Recognizing these qualities enables the educator to create initiatives that build self-confidence among individuals in the target audience. For example, a person might be willing to perform the new behavior, but not be confident that he or she can perform it. In this case, the educator can provide opportunities to try out the new idea. A hands-on demonstration at the local hardware store of how to calibrate a spreader, for example, might build homeowners' confidence in mastering that skill.

**Figure 5. Self-efficacy components** (Bandura, 1986 & 1997)

When thinking about their lives, people can:

- Symbolize

    o Extract meaning from their environment

    o Plan a course of action

    o Anticipate likely consequences of actions

    o Set goals and challenges for themselves

- Self-regulate

- Self-reflect

III. Using social assessment techniques to identify target outreach behaviors

To determine which factors may influence an audience's behavior choice and to identify details about how the specific factor is likely to affect the individual's willingness to change requires use of one or more a*ssessment techniques*. As illustrated in Figure 6, assessments can also help to clarify understanding about the particular environmental situation and help to determine what indicators to use to measure change. Educators use information resulting from these assessments to select one or more interventions that are most likely to lead to desired short and/or long-term outcomes.

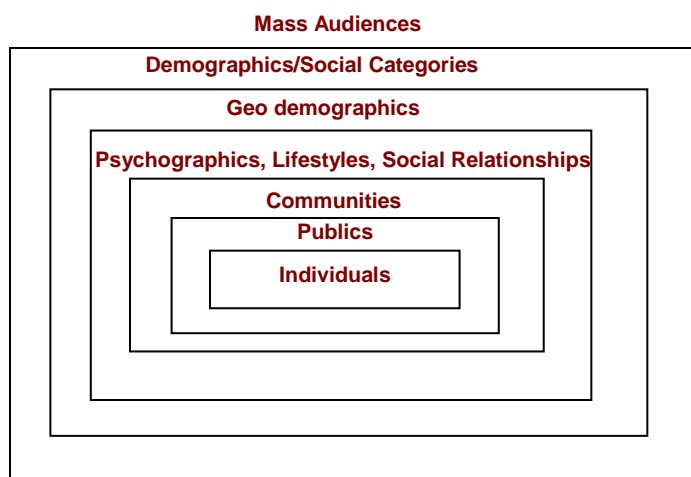**Figure 6. Connecting the situation with the people**
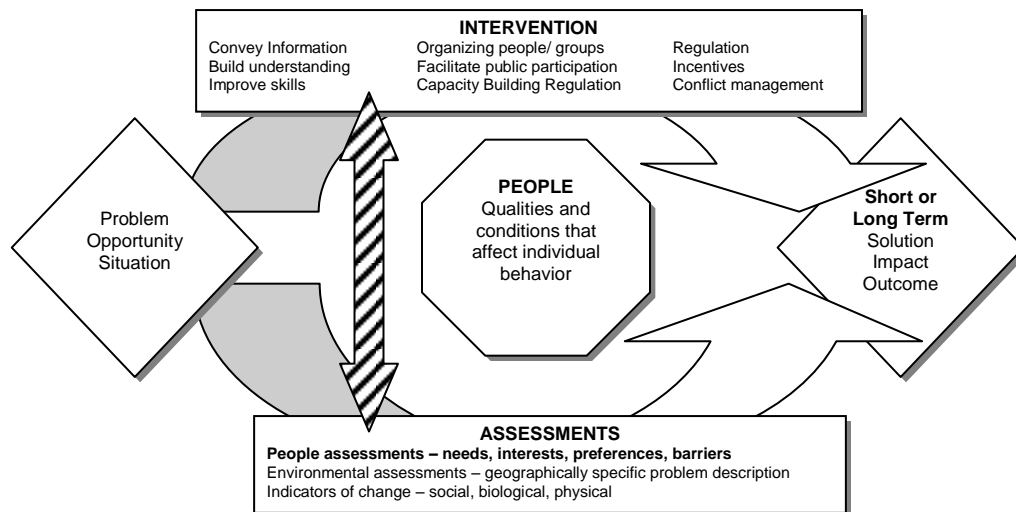
Social assessment tools – such as background studies, surveys, observations, interviews, and focus groups – help educators to identify the characteristics of individuals, a community, or a community of interest most closely related to problem-causing behaviors.

A. Selecting a target audience

The first step is to identify an audience *segment* most important for needed changes. Segmenting a market by specific audiences is considered an essential technique in the process of promoting, selling, and distributing a product or service. Segmenting audiences for the promotion of targeted behaviors is also central to development of social marketing strategies (McKenzie-Mohr & Smith, 1999; Wilbur, 2006. Segmentation enables you to focus on people at different levels in their relationships to the environmental concern – as an individual, as part of a community, as living in a specific geographical area.

To segment an audience, divide the population into groups whose members are more like each other than members of other segments. You might segment the audience according to demographics, values and lifestyles, zip codes, geographic regions, or behavior, as illustrated in Figure 7 (Grunig, 1989).

Figure 7. Segmenting an audience

Mass Audiences
Demographics/Social Categories
Geo demographics
Psychographics, Lifestyles, Social Relationships
Communities
Publics
Individuals

Once you've selected your target audience, you can employ assessment techniques to learn about the audience or to further refine the targeted segment. Figure 8 provides an example of outcomes you might identify through an assessment process. Table III (p. 31) provides more detailed examples of how theory can help you identify significant questions. To select and apply a social assessment tool, educators must decide what kinds of information they need to know and must involve the target audience in deciding which characteristics are important.

Selecting a target audience also helps educators select outreach strategies and content that is specific to that audience. Studies of teaching and of human learning, development, and motivation show that ways of thinking and learning vary among individuals, and also with variations in the context of the learning situation. (American Psychological Association, 1997; Falk & Dierking, 2002; Holsman, 2001; Horton & Hutchinson, 1997; Knox, 1993; Merriam & Caffarella, 1999; Sgroi & Cavaliere, 1992).

The Changing Public Behavior project provides summaries and links to social assessment tools and Web sites to help the educator select a social assessment method most appropriate for the situation. (UW ERC, 2008a)

Figure 8. Sample outcomes using social assessment results	
Working with a team, educators can use social assessment results to:	**Lake nutrient management example** *Assessing the environmental situation and the target audience – lake property owners – could lead to the following sample findings*
Define the problem in specific terms: →	Nutrients in the lake affect water clarity
Understand the *critical factors* that affect the likelihood that an individual will adopt an environmentally significant behavior: →	"Dirty" water is not appealing to lake property owners
Identify *behavior goals* that the targeted audience can achieve: →	Property owners can plant and maintain effective riparian buffer strips
Select outreach techniques most relevant for facilitating behavior change by a particular audience. →	Offer neighborhood demonstrations for how to reduce soil runoff into the lake by maintaining plant barriers
→	Work with local nurseries to promote purchase of riparian-friendly species
Determine *how to measure* whether the individual achieved the behavior goal: →	Call property owners, one month after event to learn more about their planting plans
→	Conduct a neighborhood water-edge parade of gardens, one year later

IV. Choosing what to assess

To put these theories into action, the educator must work with the members of the targeted population and identity relevant *behavior*, *normative* (social norms), and *control* (self-efficacy) **beliefs**; and then strive to understand these beliefs from the perspective of the population for whom interventions are being developed (Fishbein & Cappella, 2006)(As described in Figures 2 and 12).

It is also important to understand that belief variables are not equally important in determining the likelihood of behavior adoption. One type of belief, such as *self-efficacy*, might have a stronger influence for one type of problem and a weaker influence for another. For example, Fishbein and Capella (2006) compare factors influencing adults to get a colonoscopy vs. factors influencing them to get regular exercise as an illustration of how elements of the behavior change model are likely to vary in their significance.

Whatever type of assessment technique you choose, you will need to decide exactly what to assess. You want to know more about the target audience, but which factors are likely to be most significant? Ideally, the educator will obtain measures of the variables in the *Integrative Model of Behavior* (Figure 11, p. 17) as they **relate to a specific behavior** for both the individual, and for the population:

- Background influences
- Behavior beliefs and attitudes
- Normative beliefs and norms
- Control beliefs and self-efficacy
- Environmental factors or constraints
- Skills and abilities

But to simplify the decision about what to assess, start by comparing "doers" and "non-doers" (Booth, 1995; summarized in UW ERC, 2007). What specific factors make one adopt a practice and the other not? Identify skills and performance deficits. Do people refrain from a practice because they don't know how to do it, or don't believe that they can perform the behavior, or because of other factors, such as access to appropriate technology or lack of awareness of positive consequences? Then, identify the specific beliefs that discriminate between *those who do* and *those who do not* perform the behavior (or intend to perform the behavior), considering behavior beliefs, normative beliefs, and control beliefs.

A. Indicators of change

The choice of what to assess is also affected by the need to show that an outreach initiative has an impact on the environmental management concern. This can be tricky. The environmental system may not show a change in biological, chemical, or physical measures for a long time after the intervention. The outreach initiative may have been successful, but not achieved the scale of change needed; or years of application are required before a change can be observed; or the improvement is not evident due to change in climate patterns, land uses, or other physical change. For these reasons, when educators want to document outreach impacts, they may need to develop "indicators of change" that are based on our ability to *predict* human behaviors.

Indicators of change can measure **a change** in the individual's a) intention to perform a behavior; or b) belief that he or she can perform the behavior. Since the *intention to perform a behavior*, rather than an attitude toward the behavior, is closer in people's minds to the actual behavioral performance, "this implies that we should be able to predict specific behaviors with considerable accuracy from intentions to engage in the behaviors under consideration" (Ajzen & Fishbein, 2005; emphasis added). (See Figures 2 and 11.)

Self-efficacy beliefs – such as a person's belief about the ease of performance of a specific behavior and his or her beliefs about barriers and benefits – can also serve as predictors when they are measured in terms of the *behavior in question*, including the precise nature of required skills and requisite sub skills. But remember, performance of the actual behavior is not only governed by behavioral intentions, but also by the person's background, environmental factors or constraints, and a person's skills and abilities as illustrated in Figure 11 (p. 17).

Measuring behavioral *intentions* or changes in *self-efficacy beliefs* before and after an outreach intervention will let educators know what to expect. If the behavior change initiative was well connected to behaviors known to influence the environmental problem, then the

educator will be able to demonstrate *movement toward* addressing a specified environmental problem. Table III (p. 31) provides sample questions for investigating a person's intention to build a rain garden. A rain garden is a home garden that soaks up rain water from a roof, driveway or lawn. For the rain garden, Table III examples show how to investigate each of the major behavior elements known to contribute to a person's intention: behavior, normative, and control beliefs (Shaw and UW URPL, 2007).

Developing Social Indicators for NPS Management (Prokopy et al., 2008) is a resource describing how to use pre-event surveys to identify potential indicators and to use post-event surveys to determine change in indicator values.

V. Creating change

Social assessment applications can help the educator learn more about the audience of interest. But then the rubber hits the road – you have to figure out which quality or qualities to emphasize in an outreach initiative. Fishbein and Capella (2006) provide a simple chart that you might find helpful in designing an outreach initiative (Figure 9). A focus on self-efficacy skills and habits is likely to be the most productive in terms of reaching your goals. But depending on the situation, it may be necessary to focus more on the context or constraints related to the problem. It's important, however, to be clear about your behavior change goal (Figure 10).

Figure 9. Creating change *(modified from Fishbein & Capella, 2006)*			
Behavior	**Intention to perform**	**Intervention to influence behavior**	
		Not performing	Performing
Recommended behavior	No	Change outcome, normative, and/or self-efficacy beliefs	Encourage positive intention
	Yes	Improve skills Reduce or help overcome barriers to performance	No intervention, or Maintain positive intention

Figure 10. Steps to selecting a behavior change goal
1. Describe the *preferred environmental practice* that could have an impact on the environmental problem. Integrate advice from experts, stakeholders, and key informants.
2. Outline *single behaviors* required to implement the environmental practice. a. An ideal behavior is a single, observable action that experts consider people need to perform in order to reduce or help resolve a specific environmental problem.

> **Figure 10. Steps to selecting a behavior change goal**
>
> 3. Assess potential for adoption of single behaviors and potential for adoption of the environmental practice.
>   a. Does the behavior or practice meet an audience need or address an interest? (Background influence)
>   b. Does it have an impact on the problem? (Behavior beliefs)
>   c. Does it provide users with an observable consequence? (Behavior and Control beliefs)
>   d. Is it similar to what the user does already? (Normative and Control beliefs)
>   e. Is it simple for the user to do? (Control beliefs, skills, and abilities)
>   f. Is it low cost in $, time and energy for the user? (Environmental factors or constraints)

A. Applying education and communication techniques

Design an outreach initiative based an assessment that the behavior you have selected has a realistic potential of being adopted by the target audience. Once you have selected the behavior that the target audience is able and likely to adopt, you can choose from is a gamut of outreach techniques that, when applied to address specific audience qualities, are likely to be successful. Educators need to consider, in part, whether they want a short-term outcome or want to build capacity for long-term change.

There are many approaches shown to be effective in creating change (details in Table II, p. 25):

- Community/group organization and development
- Education as transformation
- Social marketing
- Transformational education

Of these, social marketing is more geared to *short term change* while community organization integrates outreach initiatives with capacity-building in the effort to create a *sustainable change*. Another fact sheet in the Changing Public Behavior series, *Step 7 – Select Intervention Techniques*, (UW ERC, 2008b) provides further advice for how to make this decision.

Behavior change studies indicate that the following techniques are most likely to be effective in promoting a specific behavior:

- Ask for a commitment (Normative belief)
- Provide a specific prompt, near behavior (Normative belief)
- Communicate the norm (Normative belief)
- Remove barriers (Control belief and environmental factors)
- Provide information (Environmental factors)
- Increase skills (Skills and abilities)
- Engage the audience in a problem-solving activity (Control beliefs)

Educators can focus on building skills that help people *practice*: making choices; considering how much effort they might be willing to expend on an activity; how to persevere when confronting obstacles; and how to access help in order to be resilient in the face of adverse situations (Bandura, 1986 & 1997).

Educators can also influence self-efficacy beliefs by providing:
- A mastery experience
- Modeling (vicarious experience)
- Social persuasion that cultivates a person's beliefs in their capabilities while at the same time ensuring that the goal is attainable.

B. Putting it all together

The following principles capture advice for educators focused on changing behavior (Gardner & Stern, 1996):

- Use multiple intervention types to address factors limiting behavior – because limiting factors:
  - Are numerous (technology, attitudes, knowledge, money, convenience, trust)
  - Vary with actor and situation, and over time
  - Affect each other (interactive principle)
- Understand the situation from the actor's perspective
- When limiting factors are psychological, apply understanding of human choice processes
- Address conditions beyond the individual that constrain pro-environmental choice
- Set realistic expectations about outcomes
- Continually monitor responses and adjust programs accordingly
- Stay with the bounds of the actors' tolerance for intervention
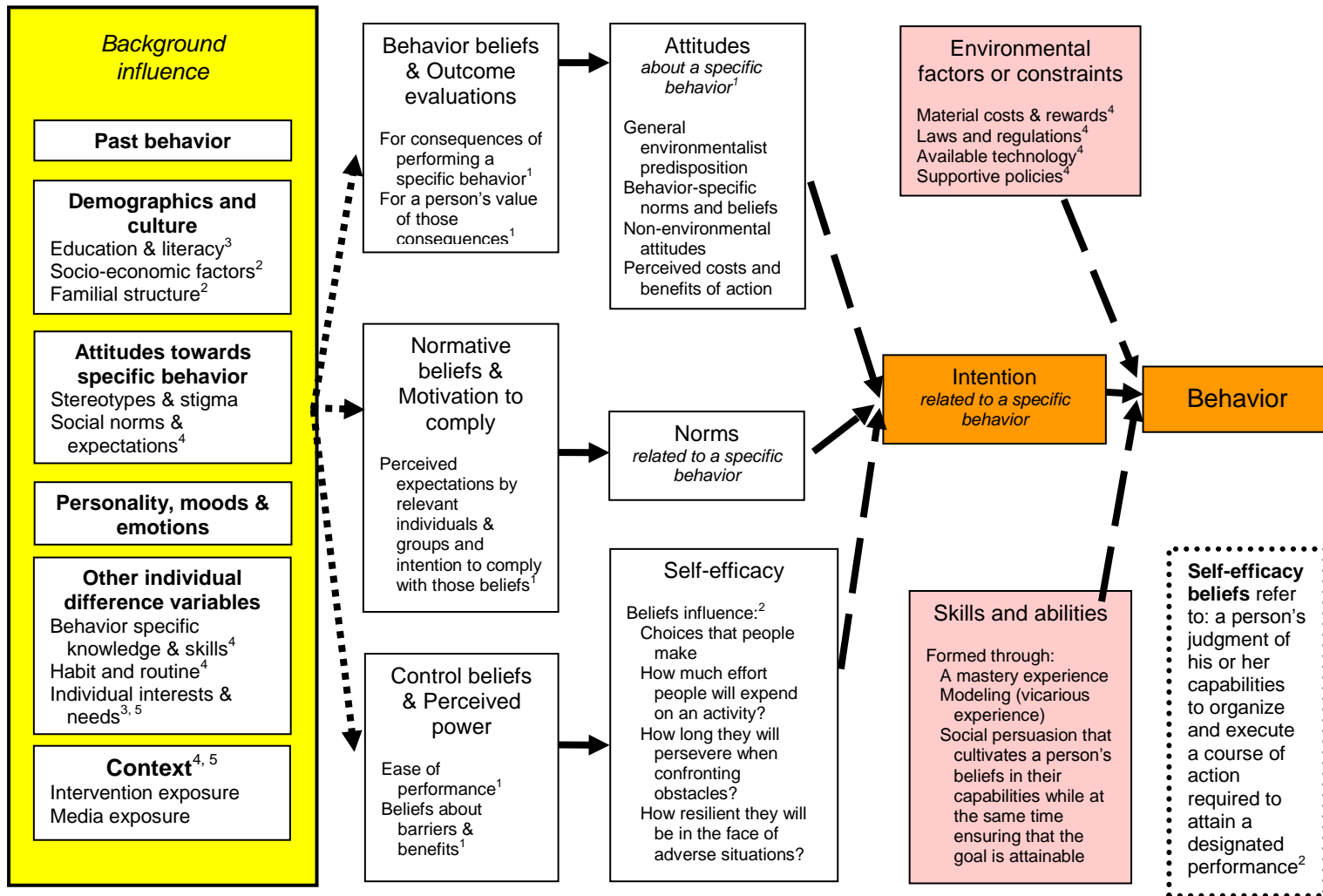- Use participatory methods of decision making

REFERENCES

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 173-221). Mahwah, NJ: Erlbaum.   CHECK

American Distance Education Consortium. ADEC Principles for Distance Teaching and Learning. Available at http://www.adec.edu/admin/papers/distance-teaching_principles.html

American Psychological Association Board of Educational Affairs. Learner-Centered Psychological Principles, as described at www.apa.org/ed/lcp.html

Anderson, L. W. & D. R. Krathwohl. (2001). A Taxonomy for Learning, Teaching, and Assessing. A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

Andrews, E., M. Smith, and G. Wise. 2002. The Community Based Environmental Education model (CBEE) documented in *"A Model of Community-Based Environmental Education".* Chapter 10 in *New Tools for Environmental Protection: Education, Information, and Voluntary Measures.* National Research Council Division of Behavior and Social Sciences and Education: Committee on the Committee on the Human Dimensions of Global Change, Thomas Dietz and Paul C. Stern, editors. National Academy Press.

Andrews, Stevens & Wise. (2002). A Model of Community-Based Environmental Education*.* Chapter 10 in *New Tools for Environmental Protection: Education, Information, and Voluntary Measures.* National Research Council Division of Behavior and Social Sciences and Education: Committee on the Committee on the Human Dimensions of Global Change, Thomas Dietz and Paul C. Stern, editors. National Academy Press.

Bandura, A. (1986 & 1997). From summary provided by F. Pajares, Emory University, http://des.emory.edu/mfp/eff.htmBooth, E. M. (1996). *Starting With Behavior – A Participatory Process for Selecting Target Behaviors in Environmental Programs.* Washington, DC: GreenCOM, Academy for Educational Development.

Falk and Dierking. 2002. *Lessons without limit: how free-choice learning is transforming education.* Walnut Creek, CA AltaMira Press.

Fedler, A. 2001. *Defining Best Practices in Boating, Fishing, and Stewardship Education.* Report to the Recreational Boating and Fishing Foundation, Alexandria, VA. Available at www.rbff.org/educational/

Festinger, L. (1957). A theory of cognitive dissonance. Stanford, CA: Stanford University Press.

Fishbein, M. & Cappella, J. N. (2006).The Role of Theory in Developing Effective Health Communications. Journal of Communication 56: S1–17.

Flora. C. B. (2006). Education: *Is It an Essential Ingredient for Community-Based Water Management?.*In Best Education Practices (BEPs) for Water Outreach Professionals: Defining BEPs, Refining New Resources and Recommending Future Actions — Report and Proceedings. Madison: University of Wisconsin, Environmental Resources Center. Accessed on February 25, 2009 at http://wateroutreach.uwex.edu/proceedings.cfm

Gardner, G. T., & Stern, P. C. 1996. Environmental problems and human behavior. Boston: Allyn and Bacon. p. 159.

Grunig, J. E. (1989). Publics, audiences and market segments: Segmentation principles for campaigns. In C.T. Salmon (Ed.), Information campaigns: Balancing social values and social change (pp. 199-228). Newbury Park: Sage.

Heimlich & Ardoin. 2008. Understanding behavior to understand behavior change: A literature review. *Environmental Education Research,* 14: 3, June 2008, pp. 215-237.

Holsman, R. 2001. *What Works . . . Documenting standard practices for aquatic resource education.* A report to the U.S. Fish and Wildlife Service – Region 5, Federal Aid. Summarizes environmental education, outdoor education and fisheries education studies from over 130 authors.

Horton, R. L. & S. Hutchinson. 1997. The Learning Cycle (student-centered inquiry education developed from Piaget's learning theory and an extension of John Dewey's philosophy of education), as described in *Nurturing Scientific Literacy among Youth through Experientially Based Curriculum Materials.* Center for 4-H Youth Development, College of Food, Agricultural and Environmental Sciences. Columbus: The Ohio State University.

Jones & Silva. (1991).

Knox, A. B. (1993). Strengthening Adult and Continuing Education: A Global Perspective on Synergistic Leadership. San Francisco: Jossey Bass.

McKenzie-Mohr, D., & Smith, W. (1999). Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing. Gabriola Island, B.C.: New Society Publishers.

Merriam, S. B., & Caffarella, R. S. (1999). Learning in Adulthood: A Comprehensive Guide (2nd ed.). San Francisco: Jossey-Bass.

Mezirow, J. (2000). *Learning as Transformation: Critical Perspectives on a Theory In Progress.* San Francisco: Jossey Bass

Ohio Department of Natural Resources, Division of Soil and Water Conservation. (2003). *Soil and Water Conservation District Outreach: A Handbook for Program Development, Implementation and Evaluation.* Columbus, OH

Prochaska & Velicer. (1997).

Prokopy, L., Genskow, K., et al. (2008) The Social Indicator Planning and Evaluation System (SIPES) for Nonpoint Source Management. A Handbook for Projects in USEPA Region 5. Accessed at, http://www.uwex.edu/ces/regionalwaterquality/Flagships/SI-Docs/SI%20Handbook6-08.pdf, February 18, 2009.

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). New York: Free Press.)

Scott, W. & J. Fien. 1999. *An evaluation of the contributions of educational programmes to conservation within the WWW network*: Final Report. Unpublished report to the Worldwide fund for Nature, Gland, Switzerland.

Sgroi, A., & Cavaliere, L. A. (1992). Concluding Notes: A Direction for Learning. In L. A. Cavaliere & A. Sgroi (Eds.), Learning for Personal Development (pp. 115-124). San Francisco: Jossey-Bass.

Shaw, B. (2009). Using temporally oriented social science models and audience segmentation with social marketing to influence environmental behaviors. In L. Kahlor & P. Stout (Eds.), Understanging and Communicating Science: New Agendas in Science Communication. Mahway, New York, NY: Routledge.

Shaw, B. & UW URPL students. 2007. Rain Gardens for Lake Ripley Watershed. Madison: University of Wisconsin Departments of Life Sciences Communication and Urban and Regional Planning.

Simmons, B. et al. 2000. Environmental education principles as described in *Guidelines for the Initial Preparation of Environmental Educators*. The North American Association for Environmental Education. Washington, D.C.

Stern, P., T. Dietz, T. Abel, G. Guagnana, L. Kalof. 1999. A Value–Belief–Norm Theory of Support for Social Movements: The Case of Environmentalism. Human Ecology Review, Vol. 6, No. 2.

Stevens, M. & E. Andrews. (2006). *Outreach that makes a difference! Target audiences for water education – A research meta-analysis*. Retrieved February 2006, from http://wateroutreach.uwex.edu/beps/MAcoverTOC.cfm

University of Tennessee, Office of Information Technology, Educational Technology Collaborative. Instructional Module components and evaluation. See example at http://edtech.tennessee.edu/%7Eset4/default.html

US EPA. (2003). Getting in Step: A Guide to Effective Outreach in Your Watershed http://www.epa.gov/watertrain/gettinginstep/

UW Environmental Resources Center (ERC). 2004. Essential Best Education Practices. Accessed at http://wateroutreach.uwex.edu/beps/essential.cfm and http://wateroutreach.uwex.edu/use/assessworksheet.cfm, February 26, 2009.

UW Environmental Resources Center (ERC). 2007. Behavior change planning tool: educating about behavior and the environment. Accessed at, http://wateroutreach.uwex.edu/documents/CPBEnvbehworksheet9_08.pdf, February 18, 2009.

UW Environmental Resources Center (ERC). 2008a. Sample Social Assessment Tools. Accessed at http://wateroutreach.uwex.edu/4SATsTable1.cfm, February 26, 2009.

UW Environmental Resources Center (ERC). 2008b. *Step 7 – Select Intervention Techniques*. Accessed at, http://wateroutreach.uwex.edu/CPBstep7.cfm February 18, 2009.

Wilbur, J. (2006). *Getting Your Feet Wet with Social Marketing. A Social Marketing Guide for Watershed Programs*. Utah Department of Agriculture and Food, Salt Lake City, Utah. http://ag.utah.gov/conservation/GettingYourFeetWet1.pdf

Wise, G. (1998). Appendix A: DEFINITIONS: Community Development, Community-based Education about the Environment In Appendices for An EPA/USDA Partnership to Support Community-based Education – A Discussion Paper. EPA 910-R-98-008, www.reeusda.gov/nre/nreprog.htm. Accessed February 25, 2009 at http://www.uwex.edu/erc/epacoopextappdx.html.

Figure 11. An Integrative Model of Behavior
(Adapted from Fishbein & Cappella, 2006)

Background influence		
Past behavior		
Demographics and culture Education & literacy[3] Socio-economic factors[2] Familial structure[2]		
Attitudes towards specific behavior Stereotypes & stigma Social norms & expectations[4]		
Personality, moods & emotions		
Other individual difference variables Behavior specific knowledge & skills[4] Habit and routine[4] Individual interests & needs[3, 5]		
Context[4, 5] Intervention exposure Media exposure		

Behavior beliefs & Outcome evaluations
For consequences of performing a specific behavior[1]
For a person's value of those consequences[1]

Attitudes
about a specific behavior[1]
General environmentalist predisposition
Behavior-specific norms and beliefs
Non-environmental attitudes
Perceived costs and benefits of action

Environmental factors or constraints
Material costs & rewards[4]
Laws and regulations[4]
Available technology[4]
Supportive policies[4]

Normative beliefs & Motivation to comply
Perceived expectations by relevant individuals & groups and intention to comply with those beliefs[1]

Norms
related to a specific behavior

Intention
related to a specific behavior

Behavior

Control beliefs & Perceived power
Ease of performance[1]
Beliefs about barriers & benefits[1]

Self-efficacy
Beliefs influence:[2]
Choices that people make
How much effort people will expend on an activity?
How long they will persevere when confronting obstacles?
How resilient they will be in the face of adverse situations?

Skills and abilities
Formed through:
A mastery experience
Modeling (vicarious experience)
Social persuasion that cultivates a person's beliefs in their capabilities while at the same time ensuring that the goal is attainable

Self-efficacy beliefs refer to: a person's judgment of his or her capabilities to organize and execute a course of action required to attain a designated performance[2]

1. Ajzen & Fishbein, 2005; 2. Source: A. Bandura, 1986 and 1997 from a summary provided by F. Pajares, Emory University, http://des.emory.edu/mfp/eff.htm; 3. Booth; 4. Stern et al, 1999; 5. Rogers, 2003

Table I. Changing Behavior – Theories

	Theory	Key components
Theory	*Cognitive Dissonance Theory* *Source*: Festinger, L. (1957)	Cognitive dissonance is an uncomfortable feeling caused by holding two contradictory ideas simultaneously. The "ideas" or "cognitions" in question may include attitudes and beliefs, and also the awareness of one's behavior. The theory of cognitive dissonance proposes that people have a motivational drive to reduce dissonance by changing their attitudes, beliefs, and behaviors, or by justifying or rationalizing their attitudes, beliefs, and behaviors. Dissonance normally occurs when a person perceives a logical inconsistency among his or her cognitions. This happens when one idea implies the opposite of another. Noticing the contradiction would lead to dissonance, which could be experienced as anxiety, guilt, shame, anger, embarrassment, stress, and other negative emotional states. When people's ideas are consistent with each other, they are in a state of harmony, or consonance. If cognitions are unrelated, they are categorized as irrelevant to each other and do not lead to dissonance. A powerful cause of dissonance is when an idea conflicts with a fundamental element of the self-concept, such as "I am a good person" or "I made the right decision." The anxiety that comes with the possibility of having made a bad decision can lead to rationalization, the tendency to create additional reasons or justifications to support one's choices. A person who just spent too much money on a new car might decide that the new vehicle is much less likely to break down than his or her old car. This belief may or may not be true, but it would likely reduce dissonance and make the person feel better. Dissonance can also lead to confirmation bias, the denial of disconfirming evidence, and other ego defense mechanisms. *Adapted from the Wikipedia summary, http://en.wikipedia.org/wiki/Cognitive_dissonance*

Table I. Changing Behavior – Theories

	Theory	Key components
Theory	*Diffusion of Innovation* *Source*: Rogers, E. M. (2003)	Adopters of any new innovation or idea can be categorized as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). Willingness and ability to adopt an innovation depends on adopter awareness, interest, evaluation, trial, and adoption. People could fall into different categories for different innovations Caveats: Individuals often adapt technology to their own needs, so the innovation may actually change in nature from the early adopters to the majority of users. Disruptive technologies (e.g. a new technology) may radically change the diffusion patterns for established technology. Reinforcing patterns (e.g. standardization) may lock certain technologies in place. Recent developments in this theory: *The Tipping Point: How Little Things Can Make a Big Difference* by Malcolm Gladwell (2000) *The Influentials: One American in Ten Tells the Other Nine How to Vote, Where to Eat, and What to Buy* by Jon Berry and Ed Keller (2003) According to Berry and Kelly research, influentials are: o People who are experienced in life. o People who are more likely to be well educated o People with an active orientation toward life. They attend meetings, write to politicians, serve on committees and as officers of an organization, write and talk about their opinions, participate in groups trying to influence public policy o People who are connected. They have ties to a larger number of groups than average. o People with impact or who have influence. Others look to them for advice and opinion. o People with active minds. They like to learn through people and experiences. o People who are trendsetters. They are interested in, experiment with, and use new techniques, tools, and brands.

Table I. Changing Behavior – Theories

	Theory	Key components
Theory	***Social Cognitive Theory and Self-efficacy*** *Source:* A. Bandura, 1986 and 1997	People are viewed as self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and shepherded by environmental forces or driven by concealed inner impulses. Human functioning is viewed as the product of a dynamic interplay of personal, behavioral, and environmental influences. Factors (economic conditions, socieconomic status, and familial structures) do not affect human behavior directly. They affect it to the degree that they influence people's aspirations, self-efficacy beliefs, personal standards, emotional states, and other self-regulatory influences. How people interpret the results of their own behavior informs and alters their environment and personal factors, which, in turn, informs and alters subsequent behavior. Self-efficacy beliefs refer to: people's judgments of their capabilities to organize and execute a course of action required to attain a designated performance. A person's level of motivation, emotional states, and actions are based more on what they believe [about a specific behavior] than on what is objectively true. People need to believe that their actions can produce the outcomes they desire
Theory	***Stages of Change*** (Transtheoretical Model) *Source:* Prochaska & Velicer, 1997	Behavior change involves progress through six stages of change: precontemplation, contemplation, preparation, action, maintenance, and relapse (as summarized in Shaw, forthcoming). Shaw provides detailed examples for how to encourage an individual to perform a recommended environmental behavior depending on where they are in changing their behavior.

Table I. Changing Behavior – Theories

	Theory	Key components
Theory	*Theory of Reasoned Action* *Source:* Ajzen & Fishbein, 1980	Components include: behavioral intention, attitude towards the behavior; and subjective norms. If a person *intends* to do a behavior they are likely to do it, depending on: the person's beliefs about the consequences of performing the behavior and the person's value of those consequences; the person's perception of expectations by relevant individuals or groups and their intention to comply with these expectations. The Theory of Reasoned Action links attitudes about a specific behavior with the implementation of the behavior. It focuses on intentions toward specific a behavior, and it can be applied to predict behaviors. Behavioral *intention* can not be the exclusive determinant of behavior, however, where an individual's control over the behavior is incomplete. Self-efficacy (the conviction that one can successfully execute the required behavior) is the most important precondition for behavioral change, since it determines the initiation of coping behavior.
Theory	*Theory of Planned Behavior* *Source*: Ajzen & Fishbein, 2005	The Theory of Planned Behavior focuses on *intentions* toward a *specific* behavior. It links attitudes about a *specific* behavior and the implementation of the behavior. Three types of beliefs are thought to govern behavioral intentions. • Behavioral beliefs (consequence of behavior) And attitude about self-performance of the behavior • Normative beliefs (valuing the behavior) And perception about social pressures to perform • Control beliefs (ease of performance) And beliefs about barriers and benefits ○ *Perceived behavioral control* refers to a person's estimation that a given behavior will lead to certain outcomes. Self-efficacy (the conviction that one can successfully execute the required behavior) is the most important precondition for behavioral change, since it determines the initiation of coping behavior. Self-efficacy beliefs can be applied to predict behaviors.

Table I. Changing Behavior – Theories

	Theory	Key components	
Theory	***Value-Belief-Norm Theory*** *Source:* Stern, P., T. Dietz, T. Abel, G. Guagnana, L. Kalof. 1999.	VBN is a theory of support for a social movement, as applied to the environmental movement. It outlines behavioral indicators of nonactivist environmentalism and addresses the likelihood of behaviors for: • Environmental citizenship actions (group activity) • Policy support and acceptance • Personal-sphere behaviors that agree with movement principles • Activism VBN theory, examples • I feel a sense of personal obligation to take action to stop the disposal of toxic substances in the air, water and soil. • I avoid buying products from a company that I know may be harming the environment. • I am willing to pay much higher prices in order to protect the environment. • I have voted for a candidate in an election at least in part because he or she was in favor of strong environmental protection. Studies indicate that the more difficult, time-consuming, or expensive the behavior, the weaker its dependence on attitudinal factors. In addition, the more important a behavior is in terms of its environmental impact, the less it depends on attitudinal variables, including environmental concern. Individuals who accept a movement's basic values and who believe that valued objects are threatened and that their actions can help restore those values, experience an obligation (personal norm) for pro-movement action that creates a predisposition to provide support, depending on the individual's capabilities and constraints. VBN theory demonstrates a strong association of personal norms with pro-environmental behavior, when social-psychological effects on acceptance of personal norms are considered. Behaviors toward the environment are determined by multiple variables, sometimes in interaction. Often the nature of the interaction can be described in terms of barriers or conditions limiting to behavior change. Behavior causal factors include attitudinal, contextual, and personable capability factors.	**VBN Influencing factors:** Attitudinal factors • General environmentalist predisposition • Behavior-specific norms and beliefs • Non-environmental attitudes • Perceived costs and benefits of action Contextual factors • Material costs and rewards • Laws and regulations • Available technology • Social norms and expectations • Supportive policies • Advertising Personal capabilities • Literacy • Social status • Financial resources • Behavior-specific knowledge and skills • Habit and routine

Table I. Changing Behavior – Theories

	Theory	Key components
Theory	***An Integrative Model of Behavior*** *Source:* Fishbein & Cappella, 2006	The integrative model brings together a number of theoretical perspectives to suggest that only a limited number of variables must be considered in predicting and understanding any given behavior. According to this model, a behavior is most likely to occur if: • A person has a strong intention to perform the behavior • A person has the necessary skills and abilities • There are no constraints preventing behavioral performance *Intention* is determined by: • Attitude toward performing the behavior • Perceived norms concerning performance of the behavior • Self-efficacy with respect to performing the behavior • Relative importance of these depends upon both the behavior and the population Attitudes, perceived norms, and self-efficacy are a function of underlying *beliefs about*: • The outcomes of performing the behavior • The normative prohibitions and/or behaviors of specific relevant individuals or groups • The specific barriers to (or facilitators of) behavioral performance

Table II. Changing Behavior – Techniques

	Technique	Definition	Key components

Technique	***Community/Group Organization and Development***
	
	Sources:
	G. Wise (1998)
	Andrews, Stevens & Wise (2002)
	Flora (2006)
	Jones & Silva (1991)
		Community development is both process and product. It includes problem solving, community building, and systems interaction. An integrated approach assesses the problem, goes on to build community capacity, and importantly, addresses the problem.
		
		Community refers to the focus of the interest at question. It implies more than merely a physical place, although it can, and often does include a geographic element. It may reference a discrete collection of persons about which a common interest is shared. It often is made up of diverse perspectives surrounding a common issue.
		
		Community development efforts build "the capacity of people to work collectively in addressing their common interests" (Maser, 1997). Efforts often depend on principles of successful strategic planning and visioning, *Community Visioning/Strategic Planning Programs: State of the Art* (Walzer, et al, 1995), including:
		(1) Having a *clear vision* of what one can and wants to accomplish
		(2) Accurately *assessing the strengths and limitations* of the community
		(3) *Creating goals and objectives* which will result in achieving the vision
		(4) Establishing a set of *strategies and action plans* for accomplishing community goals and objectives
		(5) Exhibiting *perseverance and follow-up* on all details and over time
		(6) Continually *evaluate and take corrective action* when programs
			• Problem-solving to generate action;
			• Community building to establish broad ownership for that action;
			• Systems interaction to give necessary direction to the action.
			• A balance in developing different types of capital, including natural, cultural, human, social, political, financial, and built capital. Capitals are resources invested to create new resources over a long time horizon.
			• A community-based approach to identifying opportunities, problems and potential solutions emphasizing building local skills and supporting voluntary actions as an element of the education design.
			  o Community –Based Environmental Education:
			    ▪ is locally based
			    ▪ works with a coalition or group
			    ▪ takes action based on information
			    ▪ practices quality education with broader groups

Table II. Changing Behavior – Techniques

	Technique	Definition	Key components

Technique	***Education as Transformation***
	
	Sources:
	Anderson, L. W. & D. R. Krathwohl, 2001
	Andrews, 1998 (check)
	Ohio DNR, 2003
		Education relies on the existence of a body of knowledge which is not only transferred to the individual, but is instrumental in transforming the individual. The individual has to actively receive the knowledge and know how to use it.	A continuum of choices:
			
			Content ⟷ process
			  o Prompts (e.g. point of purchase information)
			  o Participatory action research
			Learning theory suggests that a process emphasis is more effective than a content emphasis in the long term, but sometimes content is what's missing.
			
			Expert centered ⟷ learner centered
			  o Expert produced display at an event
			  o Audience developed service project
			Will the outreach intervention be controlled by a leader or managed by participants? Either is appropriate depending on what you need to do, but a learner-centered/ participant-managed approach is more likely to lead to a sustainable change.
			
			Empowering the learner
			  o Product label information
			  o Peer to peer communication
			Does it matter if your audience participates in a process and if so at what level – consultative, collaborative, or full responsibility? The more engaged your audience is, the more likely the activity will lead to a sustainable result.

Table II. Changing Behavior – Techniques

	Technique	Definition	Key components

Technique	***Social Marketing***
	
	Sources:
	D. McKenzie-Mohr & W. Smith, 1999
	B. Shaw, 2008
	US EPA, 2003
	Wilbur, 2006
		Social marketing is the use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behavior for the benefit of individuals, groups, or society as a whole.
		
		Product, price, place, and promotion are important marketing concepts critical in social marketing campaigns.
		1. Product—The product is what you are marketing. In social marketing the product is the behavior or set of behaviors you want your audience(s) to adopt and sustain.
		2. Price—How much will it cost a person in money, time, or convenience, to take on or stop a certain behavior?
		3. Place—Place can include the channels through which the products or programs are available, or the places where the behavior change can occur. The greater access people have to the new behavior and the easier it is to do, the more chance you have of persuading people to change.
		4. Promotion—Promotion is how and where you communicate to your audience about the product (behavior), price and place. Promotional channels can range from face to face contact to big budget advertising. In social marketing promotion is usually a mix of several community based approaches and the best mass media for your audience and your budget.
			1. Select specific behavior you want people to apply.
			2. Identify perceived barriers and benefits of engaging in both the current and preferred behavior.
			• Compare "doers" and "non-doers."
			  o What specific factors make one adopt a practice and the other not?
			• Identify skills and performance deficits.
			  o Do people refrain from a practice because they don't know how to do it or because of other factors, such as access to appropriate technology or lack of awareness of positive consequences?
			3. Develop creative strategies to overcome barriers and enhance the benefits of the preferred behavior using a set of tools designed to modify behavior.
			• Address skills and performance deficits
			  o Develop strategies which provide skill information or teach necessary skills.
			  o Identify strategies that reduce barriers and increase positive consequences.
			• Implement behavior change strategies
			  o Commitment
			  o Prompts
			  o Communicate norms
			  o Quality communication techniques
			  o Incentives
			  o Remove external barriers
			  o

Table II. Changing Behavior – Techniques

	Technique	Definition	Key components
Technique	*Social Marketing, continued*	Social marketing consists of several basic components, including: • The exchange – In commercial marketing, exchange could be described in terms of the purchase. The goal of the exchange is that both parties will walk away satisfied. In social marketing terms, behaviors are usually the exchange currency. • Positioning – Presenting your product in the best possible way compared to the competition • Focusing on behaviors – Keep the action or behavior you want simple and singular • Understanding the target audience – The more your audience has in common with one another, the more on target you can be with your message • Creating and delivering messages that will prompt people to change certain behaviors – Social marketing campaigns deliver messages that are strategically created and positioned to give people a compelling reason to adopt a new behavior, mind-set, or lifestyle. In order to overcome the barriers to action it is necessary to understand what the barriers are and why they exist. Researching and understanding the audience is the lynchpin that holds together a social marketing campaign. • Forming strategic partnerships with community resources – In marketing terms, the message plus the support of community resources equal the product	4. Pilot test the strategy with a small segment of the community 5. Implement and evaluate the impact of the program • Conduct quantitative research o Study results of education program with a sample of the target audience. Determine applicability of study sample to larger audience. Fine tune recommendations.

Table II. Changing Behavior – Techniques

	Technique	Definition	Key components
Technique	*Transformational Education* *Source:* J. Mezirow, 2000	Building leadership around issue content in the community context. Combines information dissemination, content transmission (by an expert), and facilitation to create leadership. Mastering content knowledge and building group leadership capacity occur simultaneously.	The role of the educator is to: • Help the learner focus on and examine the assumptions that underlie their beliefs, feelings and actions • Assess the consequences of these assumptions • Identify and explore alternative sets of assumptions • Test the validity of assumptions through effective participation in reflective dialog.

Table III. Sample questions to ask. Example: when investigating a person's intention to install a rain garden (Shaw, and UW URPL 2008)

Types of beliefs	Example 1	Example 2

Behavior beliefs & outcome evaluations	**How would I be affected by building a rain garden**
	
	Measure: *1-Most negative, 6=Most positive*
	
	For me to personally build a rain garden on my property in the next two years would be:
	
	    Very unpleasant-Very enjoyable
	
	    Very expensive-Very affordable
	
	    Very difficult-Very easy
	
	    Very time consuming-Not time consuming
		How my property will be affected by a rain garden
		
		Measure: *1=Definitely decrease; 6=Definitely increase*
		
		  If I build a rain garden in my yard, my property value will:
		
		Measure: *1=Not important to me; 6=Very important to me*
		
		  The appearance of my property is:
		  Preventing standing water that could breed mosquitoes in my yard is:
		  Preventing water in my basement is:
		  Increasing my property value is:
		  Having a yard that is mostly lawn is:
		  Having a garden is:
		
		Measure: *1=Very unlikely; 2=Very likely*
		
		  Building a rain garden on my property would improve the appearance of my property.
		  If I build a rain garden, it will increase the amount of wildlife I attract to my yard.
		
		Measure: *1=Very undesirable; 6=Very desirable*
		
		  Increasing the wildlife habitat in my yard would be:
		
		Measure: *1=Definitely no; 6=Definitely yes*
		  Building a rain garden in my yard would create standing water that could attract mosquitoes.
		  Building a rain garden in my yard would make it more likely that I'd get water in my basement.

Types of beliefs	Example 1	Example 2
Normative beliefs & motivation to comply	**Anticipated opinions of others** Measure: *1=Strongly disapprove; 6=Strongly approve* If I build a rain garden in my yard, my neighbors would: If I build a rain garden in my yard, my family would: If I build a rain garden in my yard, my friends would:	**Anticipated opinions of others** Measure: *1=Not important to me; 6=Very important to me* What my neighbors recommend is: What my family recommends is: What my friends recommend is:
Control beliefs and perceived power	**My capacity to build a rain garden** Measure: *1-Definitely No, 6=Definitely Yes* I have, or could easily acquire, the knowledge needed to build a rain garden. I have the physical ability to build a rain garden. I have the financial means to build a rain garden.	**Likelihood of building a rain garden** Measure: *1=Very unlikely; 6=Very likely* I would help my neighbors build a rain garden in the next two years if they asked for my help as part of a larger community event. I (or somebody in my household) will build a rain garden on my property in the next two years if I received cost-sharing assistance. I (or somebody in my household) will build a rain garden on my property in the next two years if I am given detailed instructions how to do so. I (or somebody in my household) will build a rain garden on my property in the next two years if some of my friends and neighbors also build one. I (or somebody in my household) will build a rain garden on my property in the next two years if some of my friends and neighbors helped me. I (or somebody in my household) will build a rain garden on my property in the next two years. I (or somebody in my household) will hire someone to build a rain garden on my property in the next two years.