

**CODEBOOK for DYNAMIC ENVIRONMENTAL SCENARIOS PROTOCOL**

<u>Questions</u> (with short descriptions)	<u>Codes</u>	<u>Level descriptions</u>	<u>Exemplary responses</u>
a) Hunger-eating b) Chickens-chicks c) Comparison of the relationships	Feedback causality	<b>0:</b> Expressing irrelevant or flawed relationships <b>1:</b> Expressing unidirectional relationships <b>2:</b> Comparing and characterizing the circular relationships	<b>0:</b> Let's assume a chicken gives birth to five chicks. So, number of chickens decrease, while number of chicks increase. This is why, it decreases.  <b>1:</b> (After expressing the relation linearly)... Yes, there is a relationship between eating and hunger. Number of chicks is important for number of chickens.  <b>2:</b> (After expressing the relation linearly)... As number of chickens increase, so does the number of chicks. Because, they mate. As number of chicks increase, so does the number of chickens. Because, chicks grow up. These are different. Because one is balancing, the other is reinforcing.
Drawing the graph of graduating students based on the graph of registering students	Delay	<b>0:</b> Drawing the graph in a wrong way <b>1:</b> Drawing the graph in a right way but with some missing data <b>2:</b> Explaining the graph in an exact and correct manner	<b>0:</b> Two graphs are exactly the same <sup>i</sup> <b>1:</b> (After explaining the time axis should start two months later)... R <sup>ii</sup> : Compare the two graphs... I <sup>iii</sup> : The second one has 15 people less. <b>2:</b> (After explaining the time axis should start two months later)...The same number of people registered will be graduated after two months.
Calculating the passengers in a bus while departing from bus stops	Stock-flow thinking	<b>0:</b> Ignoring the stocks <b>1:</b> Realizing the stocks	<b>0:</b> R.: They depart from the first stop. How many are there in the bus? I.: 15 R.: OK. How many passengers are there while departing the second stop? I.: There are five people in the second stop. R.: What about the ones get off? I.: 5 people got off. 20 people got on at the second stop. R.: So ?

			<p>I.: So, 15?  <b>1:</b> R.: How many passengers are there while departing the second stop? You said 15 people got on.  I.: Yes.  R.: Then, how many people are there in the bus?  I.: 30. Because, there are also people who got on at the first stop.</p>
<p>Bluefish population  a) Examination of the bluefish population with changing fishing quotas</p>	<p>Stock-flow thinking  Feedback thinking  Predicting system behavior</p>	<p><b>0:</b> Expressing that the bluefish population will rise  <b>1:</b> Predicting that the juvenile an mature bluefish population will decline  <b>2:</b> Predicting that the number of eggs laid, juvenile population and in turn overall bluefish population will decline</p>	<p><b>0:</b> I.: Since, juvenile bluefish cannot give birth; their number will decrease at the first hand. Mature bluefish population will increase.  R.: How will it increase?  Ö.: Because they can lay eggs. The ones with 20-25 cm length cannot lay eggs.  <b>1:</b> The fish population will decrease slowly. Because fishermen want to fish and want to destroy mature and juvenile fish. The number of mature fish will decrease slowly. Because they cannot lay eggs.  <b>2:</b> I.: Since the juveniles are hunted before they will get mature, there will be no mature fish left. The mature ones are able to breed. The juveniles are hunted and they cannot breed.  R.: So, what do you think about the fate of the overall fish population?  I.: It will decrease.</p>
<p>Bluefish population  b) Suggestions for the sustainability of the population</p>	<p>Stock-flow thinking  Feedback thinking  Predicting system behavior</p>	<p><b>0:</b> Focusing on awareness-raising activities  <b>1:</b> Suggestions focusing on limitations on fishing quantity <u>or on the fishing size</u>  <b>2:</b> Justifying the suggestions with circular explanation.</p>	<p><b>0:</b> I.: I will make fishermen more conscious.  R.: On what subject will you make them conscious?  Ö.: On the necessity of breeding of fish. They must not kill them. Or, I will prepare some posters.  <b>1:</b> I think when their length outgrow 5-10 cm more than their breeding length, it should be allowed to hunt. So, this will be beneficial for the population.  <b>2:</b> The number of hunted fish should be decreased. So, the new born fish can replace the hunted ones. The</p>

			newborns should be able to grow to breeding period. <sup>i</sup>
3 <sup>rd</sup> bridge for Istanbul a) Explanation of the phrase “Each bridge creates its own traffic”	Feedback thinking	<p><b>0:</b> Stating that the congestion will decrease with the construction of a new bridge</p> <p><b>1:</b> Stating that the traffic problem cannot be solved with a new bridge and the new bridge will attract new traffic</p> <p><b>2:</b> Justifying why new new bridge may attract new traffic with circular explanation.</p>	<p><b>0:</b> Instead of two bridges, there will be less traffic in the case of having three bridges.</p> <p><b>1:</b> I think when they approach to the bridge; there will be more traffic on the bridge. [S/he mentions about the people who would have started to live by the bridge]</p> <p><b>2:</b> The phrase “Each bridge creates its own traffic.” Is really true. Suppose that a new has been constructed. And, people eventually travel across the bridge. If people want to go somewhere far away, they will cross the bridge and traffic will get messy. And, there will be more apartments nearby the bridge. Then, there will be airport nearby. Traffic will also be the same and even more because there will be more apartments nearby.</p>
3 <sup>rd</sup> bridge for Istanbul b) Suggestions other than construction of the third bridge for the traffic problem	Feedback thinking	<p><b>0:</b> Suggestions related to increasing the supply capacity of routes such as construction of new roads, bridges, green wave applications and etc.</p> <p><b>1:</b> Suggestions related to limiting the travelling demand with private cars, such as increasing the fuel oil prices</p> <p><b>2:</b> Explaining the suggestions related to limiting the demand with circular explanations.</p>	<p><b>0:</b> I will construct other bridges.</p> <p><b>1:</b> I will support cycling rather than constructing a new bridge.</p> <p><b>2:</b> I will limit the number of vehicles in the traffic. I will penalize the cars with only a driver at the rush hours. So, I will encourage people to prefer public transportation, service buses, or car-pooling and the number of vehicles in the traffic will lessen eventually. <sup>i</sup></p>

<sup>i</sup> No response at his level was found during the analysis. The response is hypothetical.

<sup>ii</sup> Researcher/interviewer

<sup>iii</sup> Interviewee