

# Representing Theories of Change Using the Common Approach Ontologies

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Version of: 15 November 2019

Technical Report  
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# 1. Introduction

This document provides an example of using the Common Approach Core Ontologies (Fox et al., 2019a) to represent the Logic Model and Impact Chain versions of the Theory of Change. CACO provides a core set of classes for representing Theories of Change. CACO is comprised of the classes depicted in Figure 1.

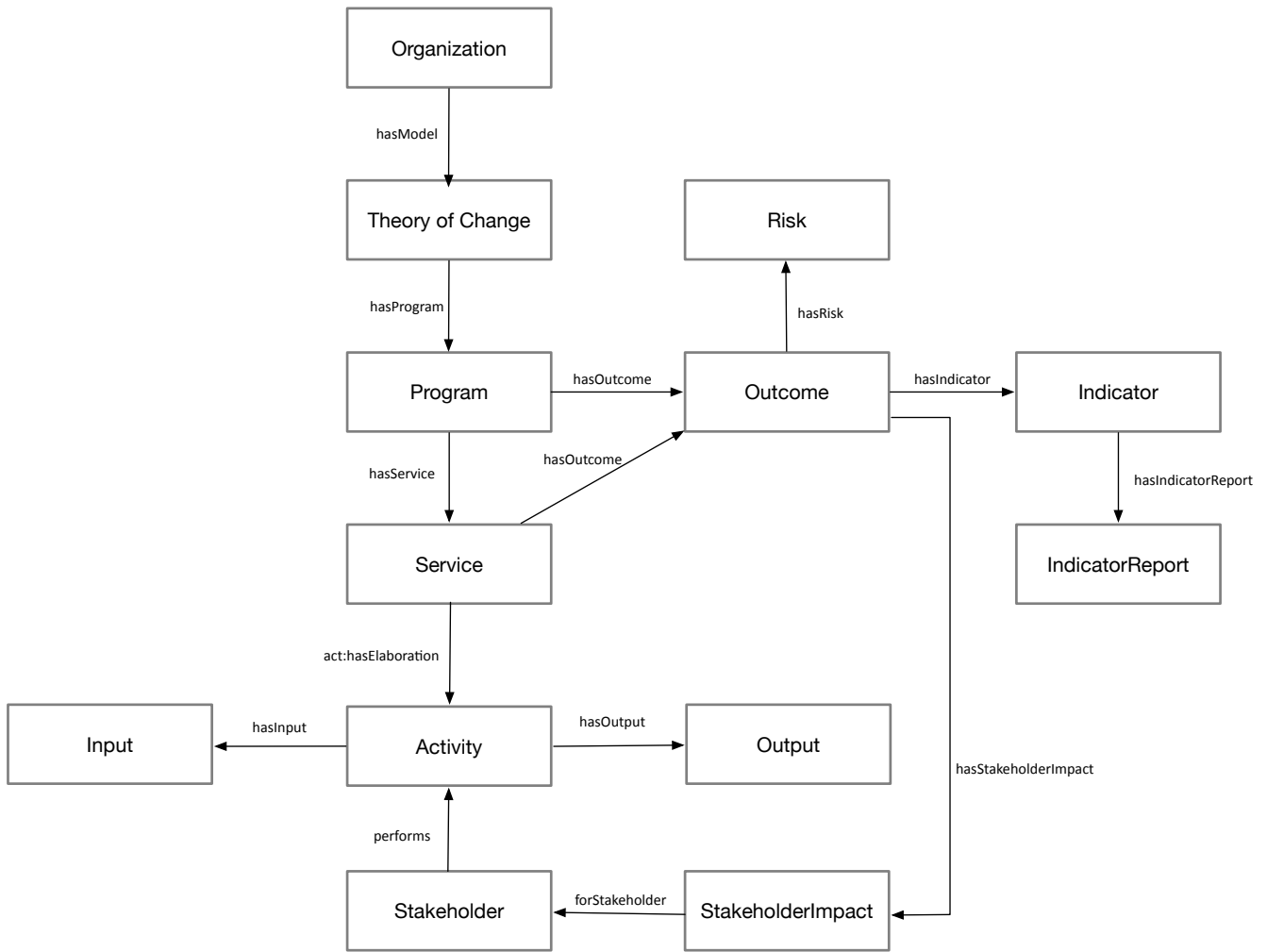


Figure 1: CACO Main Classes

The following prefixes are used in this document:

Prefix	URI
act	<a href="http://ontology.eil.utoronto.ca/tove/activity#">http://ontology.eil.utoronto.ca/tove/activity#</a>
cafo	<a href="http://ontology.eil.utoronto.ca/CAO/cafo#">http://ontology.eil.utoronto.ca/CAO/cafo#</a>
cav	<a href="http://ontology.eil.utoronto.ca/CAO/cav#">http://ontology.eil.utoronto.ca/CAO/cav#</a>

sur	<a href="http://ontology.eil.utoronto.ca/tove/survey#">http://ontology.eil.utoronto.ca/tove/survey#</a>
time	<a href="https://www.w3.org/2006/time#">https://www.w3.org/2006/time#</a>

## 2. Ve’ahavta Case Study: An Example of Logic Modelling

Ve’ahavta is a Jewish humanitarian organization dedicated to promoting positive change in the lives of people of all faiths and backgrounds who have been marginalized by poverty and hardship. Ve’ahavta mobilizes volunteers in meaningful, hands-on experiences to fulfill our collective responsibility to care for our neighbour.

Ve’ahavta offers two types of programs: Client Services and Community Mobilization.

Ve’ahavta’s Client Services are designed to create a non-linear path through which people can travel based on their own readiness. The programs help them move towards achieving their unique goals. There are four pillars on the path:

- Relief & Referral
- Expressive Arts Programming
- Work & Life Skills Training Programs
- Paid Work Training Placement Programs

Ve’ahavta’s Community Mobilization program is based on the belief that people care and want to make a difference. Ve’ahavta creates a path to grow empathy, responsibility and empowerment in community members to mobilize them. There are four pillars on the path:

- Community Programming
- Volunteerism
- Leadership
- Philanthropy

**Figure 2** depicts how CACO is instantiated to represent a Logic Model for Ve’ahavta. Of the programs and services provided by Ve’ahavta, we will model the Client Services area we model the work life and skills training program (wlstp), and within that we model the Ve’ahavta Street Academy (vsa). We have inserted in each rectangle the identifier (purple italics) for the instantiation of each class from CACO.

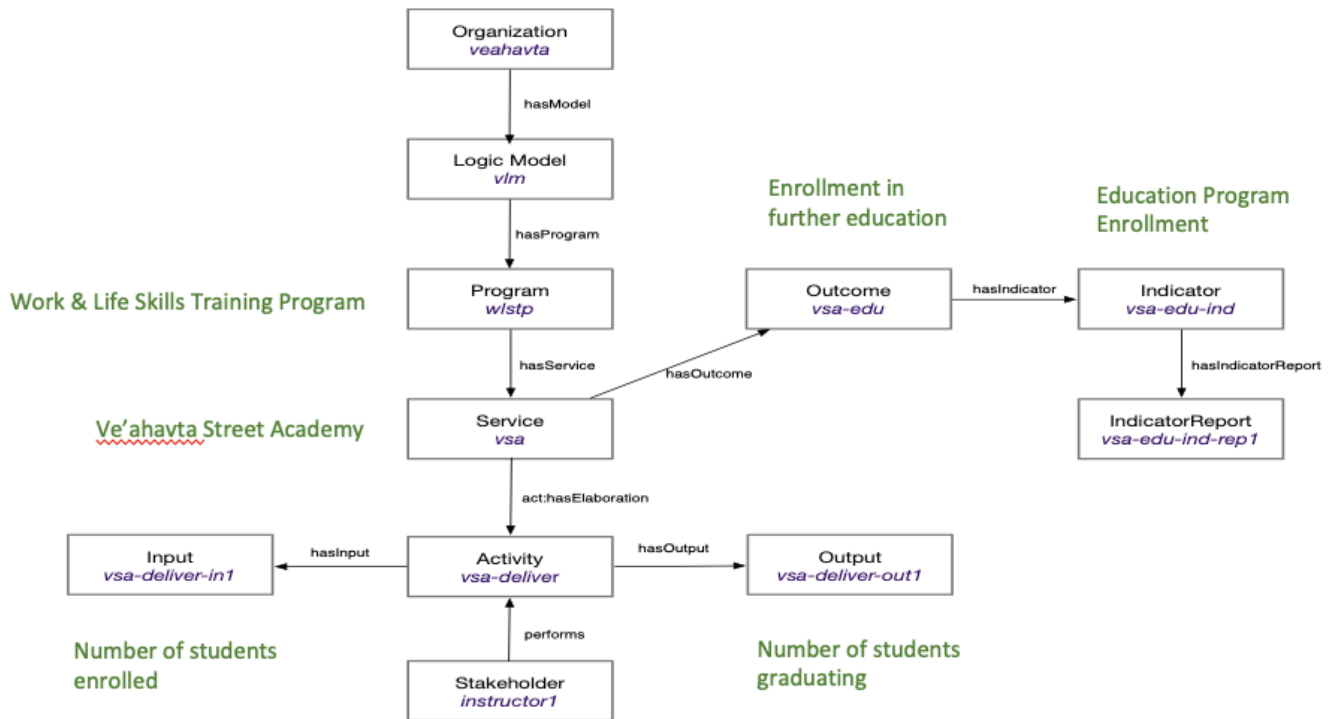


Figure 2: Concept Diagram of Ve'ahavta Logic Model

In the remainder of this section we elaborate each of the classes that make up a subset of the Ve'ahavta logic model for one of their four client facing programs. The choice of where to drill down is indicated in purple.

## 2.1. Organization: veahavta

Ve'ahavta is represented as an instance of a caco:Organization. The properties that are completed are those that are inherited from the CAVR vocabulary, plus hasModel which links the organization to the logic model.

Instance	Property	Value
veahavta	rdfs:type	cafo:Organization
	sch:name	"Ve'ahavta"
	sch:description	"Ve'ahavta is a Jewish humanitarian organization dedicated to promoting positive change in the lives of people of all faiths and backgrounds who have been marginalized by poverty and hardship. Ve'ahavta mobilizes volunteers in meaningful, hands-on experiences to fulfill our collective responsibility to care for our neighbour."
	caco:hasModel	vlm

## 2.2. Logic Model: vlm

vlm is an instance of a LogicModel. In addition to basic name and description, its stakeholders and programs can be specified. In the next section we elaboration the wlstp program.

Instance	Property	Value
vlm	rdfs:type	caco:LogicModel
	sch:name	“Ve’ahavta Logic Model”
	sch:description	“Ve’ahavta’s programs are designed to create a non-linear path through which people can travel based on their own readiness. The programs help them move towards achieving their unique goals.”
	caco:hasStakeholder	
	caco:hasProgram	rr, eap, <a href="#">wlstp</a> , pwtpp
	caco:forOrganization	<a href="#">veahavta</a>

## 2.3. Program: wlstp

wlstp is an instance of a caco:Program. It can be linked via hasService to one or more Services, it can have zero or more Outcomes (hasOutcome), and both contributing and beneficial stakeholders can be specified (hasContributingStakeholder, hasBeneficialStakeholder). All of the properties of caco:Program are defined in the CACO report.

Instance	Property	Value
wlstp	rdfs:type	caco:Program
	eop:partOf	vlm
	sch:name	“Work & Life Skills Training Program”
	sch:description	
	caco:hasService	<a href="#">vsa</a> , bffw
	caco:hasOutcome	
	caco:hasContributingStakeholder	volunteer-instructor
	caco:hasBeneficialStakeholder	

VSA is run three times a year following this high level process:

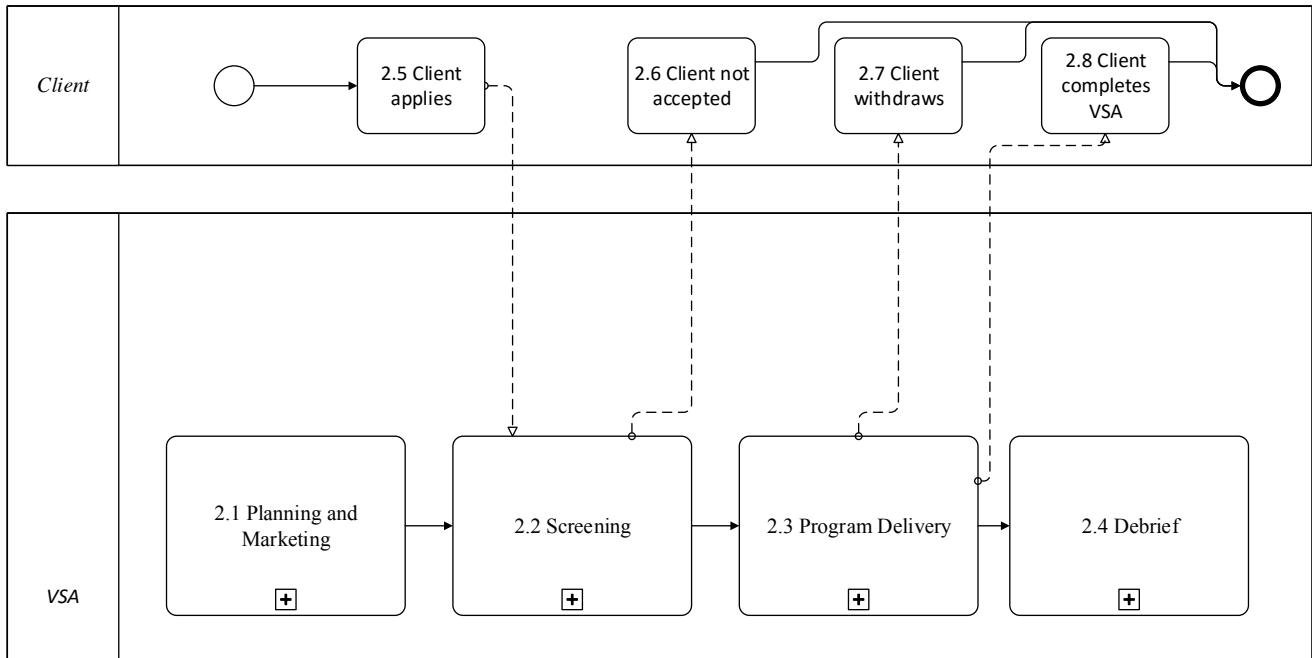


Figure 3: VSA top level process

In the next section we drill down into the vsa Service.

#### 2.4. Service: vsa

Vsa is an instance of a caco:Service. It defines the activities that deliver the service (act:hasElaboration) and the Outcomes of the service (hasOutcome).

Instance	Property	Value
vsa	rdfs:type	caco:Service
	sch:name	"Ve'ahavta Street Academy"
	sch:description	<p>"An innovative 12-month adult education program, the Ve'ahavta Street Academy (VSA), in partnership with George Brown College, provides participants with practical skills and support to achieve their goals. Volunteer experts deliver workshops on a wide range of work and life skills topics, and students work weekly with a Ve'ahavta social worker to create individual goals and plans for success. Participants receive vocational assessments to build awareness of possible career paths and earn stipends to assist them in overcoming barriers to achieving their goals.</p> <p>Success of the program is measured by three outcomes – enrolment in further education, employment or meaningful volunteer work. Our success rate is consistently above 75%."</p>

	act:hasElaboration	vsa-plan, vsa-screen, vsa-deliver, vsa-debrief
	caco:hasOutcome	vsa-edu, vsa-emp, vsa-volun

## 2.5. Activity: vsa-deliver

vsa-deliver is an instance of a caco:activity. It defines both the inputs (hasInput) and outputs of the activity (hasOutput).

Instance	Property	Value
vsa-deliver	rdfs:type	caco:Activity ( <i>can be replaced by ICHI taxonomy of activities</i> )
	sch:name	"VSA delivery activity"
	sch:description	
	act:subActivityOf	vsa
	caco:hasInput	vsa-deliver-in1
	caco:hasOutput	vsa-deliver-out1

## 2.6. Input

vsa-deliver-in1 instantiates caco:Input. It defines both the planned and actual numbers of clients entering the vsa session.

Instance	Property	Value
vsa-deliver-in1	rdfs:type	caco:Input
	sch:name	"Number of students enrolled"
	sch:description	"defines the planned and actual intake of clients into the VSA training program"
	caco:requiredBy	vsa-deliver
	caco:hasPlannedAmount	vsa-deliver-in1-pam
	caco:hasAmount	vsa-deliver-in1-am
	time:hasTime	
vsa-deliver-in1-pam	rdfs:type	om:Quantity
	om:value	vsa-deliver-in1-pam-measure
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )



vsa-deliver-in1-pam-measure	rdfs:type	om:Measure
	om:numerical_value	30
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )
vsa-deliver-in1-am	rdfs:type	om:Quantity
	om:value	vsa-deliver-in1-am-measure
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )
vsa-deliver-in1-am-measure	rdfs:type	om:Measure
	om:numerical_value	30
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )

## 2.7. Output

vsa-deliver-out1 instantiates caco:Output. It defines both the planned and actual numbers of graduates from the vsa class.

Instance	Property	Value
vsa-deliver-out1	rdfs:type	caco:Output
	sch:name	“Number of students graduating”
	sch:description	“defines the planned and actual number of graduating of clients of the VSA training program”
	requiredBy	vsa-deliver
	hasPlannedAmount	<a href="#">vsa-deliver-out1-pam</a>
	hasAmount	<a href="#">vsa-deliver-out1-am</a>
	time:hasTime	
vsa-deliver-out1-pam	rdfs:type	om:Quantity
	om:value	<a href="#">vsa-deliver-out1-pam-measure</a>
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )
vsa-deliver-out1-pam-measure	rdfs:type	om:Measure
	om:numerical_value	30
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )
vsa-deliver-out1-am	rdfs:type	om:Quantity

	om:value	vsa-deliver-out1-am-measure
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )
vsa-deliver-out1-am-measure	rdfs:type	om:Measure
	om:numerical_value	25
	om:unit_of_measure	iso21972:pc ( <i>count of people standard</i> )

## 2.8. Outcome: vsa-edu

Instance	Property	Value
vsa-edu	rdfs:type	caco:Outcome
	sch:name	“Enrollment in further education”
	sch:description	“As of the three outcomes of the VSA program, enrollment in further education demonstrates that a client is on the path to ...”
	forDomain	sdg4, sdg8
	hasIndicator	<a href="#">vsa-edu-ind</a>
	hasStakeholderImpact	<a href="#">shi</a>

## 2.9. Indicator: vsa-edu-ind

vsa-edu-ind defines the indicator. Using the ISO 21972 and OM ontologies, it can provide a complete definition of the indicator, including its numerator and denominator, and the definition of the populations (e.g., stakeholders) that make each up.

Instance	Property	Value
vsa-edu-ind	rdfs:type	caco:Indicator
	sch:name	“Education Program Enrollment”
	sch:description	“Number of people who report enrollment in educational programs after completion of vsa”
	hasIndicatorDefinition	<a href="#">vsa-edu-ind-def</a>
	sch:identifier	“IND48” ( <i>defined in the repository</i> )
	hasIndicatorReport	<a href="#">vsa-edu-ind-rep1</a>
vsa-edu-ind-def	rdfs:type	cafo:IndicatorDefinition

om:unit_of_measure	iso21972:population_ratio_unit
om:numerator	vsa-edu-ind-num
om:denominator	vsa-edu-ind-den

## 2.10. IndicatorReport: vsa-edu-ind-rep1

The following is an example of an Indicator Report. It reports the value of the Indicator for a specified time interval, and provides the methodology and the datasets used to derive the indicator value. Note that more detail on the derivation numerator and denominator is specified in the value of the respective properties in vsa-edu-ind.

Instance	Property	Value
vsa-edu-ind-rep1	rdfs:type	caco:IndicatorReport
	forOrganization	veahavta
	forIndicator	vsa-edu-ind
	hasValue	<a href="#">vsa-edu-ind-rep1-val</a>
	hasMethod	<a href="#">vsa-edu-ind-rep1-survey</a>
	hasDataSources	
	sch:identifier	"IND48-IR1" ( <i>defined in the repository</i> )
	sch:name	"Indicator Report for Education Program Enrollment"
	forIndicator	"Enrollment in further education"
	forSOrganization	"Ve'ahavata"
	forYear	2018
	hasSValue	"85%"
	sch:dateCreated	
vsa-edu-ind-rep1-val	rdfs:type	om:Quantity
	om:value	vsa-edu-ind-rep1-val-m
vsa-edu-ind-rep1-val-m	rdfs:type	om:Measure
	om:numerical_value	85
	om:unit_of_measure	om:percent
vsa-edu-ind-rep1-	rdfs:type	sur:Survey

survey	sur:hasSPurpose	“To determine what percentage VSA graduates in 2018 subsequently enrolled in an educational institution after six months.”
	sur:hasSDemographic	“Graduates of VSA during 2018”

### 2.11. StakeholderImpact

shi is an instance of a StakeholderImpact. It defines who is impacted, the intended impact, the impact it produces, and indicators of the impact.

imp is an instance of Impact It defines the stakeholder impacted, how important the impact is and from whose perspective.

Instance	Property	Value
shi	rdfs:type	caco:StakeholderImpact
	forStakeholder	
	intendedImpact	positive
	produces	imp
	hasIndicator	
imp	rdfs:type	caco:Impact
	forStakeholder	
	fromPerspectiveOf	
	hasImportance	

## 3. Our House Case Study: An Example of Impact Chains

As stated in the Our House Performance Report of 22 October 2014: “Our House’ supports people that are marginalized as a result of mental health, addiction and poverty issues. To achieve this, they work alongside eight other housing providers and a range of community partners—combining the provision of safe, affordable and stable housing, with support and training for tenants around financial, practical and emotional skills.

Our House’s philosophy centres around giving their tenants choice, in voicing preferences about the type of accommodation that they would like to live in, the community activities they would like to engage in and the governance of Our House as a corporation. “

Our House’s Theory of Change is defined as an Impact Chain. The following depicts a subset of their “impact chain”. Note that the outcome chain omits the structural aspect of their organization, i.e., Program, Service, Stakeholders, etc., to focus strictly on activities, outcomes and indicators.

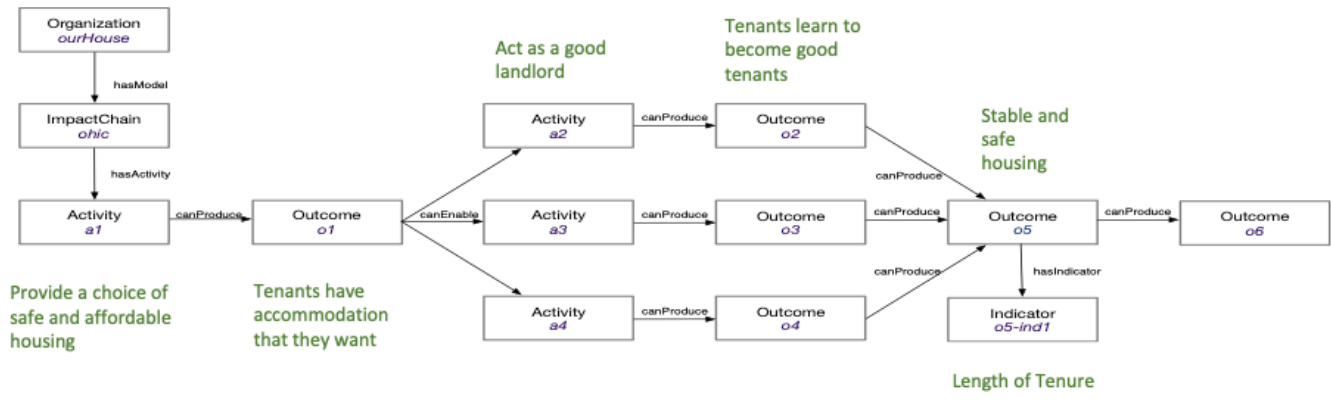


Figure 4: Our House Impact Chain

In the remaining subsections we represent one path through the outcome chain. Each instance of an Activity and Outcome has a unique identifier starting with an a, or o.

### 3.1. Organization: ourHouse

Our House is represented as an instance of a `caco:Organization`. The properties that are completed are those that are inherited from the CAVR vocabulary, plus `hasModel`, which links the organization to the logic model.

Instance	Property	Value
ourHouse	<code>rdfs:type</code>	<code>cafo:Organization</code>
	<code>sch:name</code>	"Our House"
	<code>sch:description</code>	"Our House supports people that are marginalised as a result of mental health, addiction and poverty issues. To achieve this, they work alongside eight other housing providers and a range of community partners— combining the provision of safe, affordable and stable housing, with support and training for tenants around financial, practical and emotional skills."
	<code>hasModel</code>	ohic

### 3.2. Outcome Chain: ohoc

ohoc is an instance of an `ImpactChain`, which is composed of Outcomes, Activities and Indicators.

Instance	Property	Value
ohic	<code>rdfs:type</code>	<code>caco:ImpactChain</code>
	<code>caco:hasOutcome</code>	o1, o2, o3, o4, o5, o6

	caco:hasActivity	a1, a2, a3, a4
	caco:hasIndicator	o5-ind1

### 3.3. Activity: a1

a1 is an Activity that hasOutcome o1.

Instance	Property	Value
a1	rdfs:type	caco:Activity
	sch:name	“Provide a choice of safe and affordable housing”
	caco:hasOutcome	o1

### 3.4. Outcome: o1

o1 is an Outcome that canEnable the performance of activities.

Instance	Property	Value
o1	rdfs:type	caco:Outcome
	sch:name	“Tenants have accommodation that they want”
	caco:canEnable	a2, a3, a4

### 3.5. Activity: a2

Activity a2 canProduce Outcome o2.

Instance	Property	Value
a2	rdfs:type	caco:Activity
	sch:name	“Act as a good landlord”
	caco:canProduce	o2

### 3.6. Outcome o2

Outcome o2 can Produce another Outcome o5.

Instance	Property	Value
o2	rdfs:type	caco:Outcome
	sch:name	“Tenants learn to become good tenants”
	caco:canProduce	o5

### 3.7. Outcome: o5

The previous sections represented the chain of services, activities and outcomes that led to this outcome o5. For this outcome we associate an Indicator o5-ind1.

Instance	Property	Value
o5	rdfs:type	caco:Outcome
	sch:name	“Stable and safe housing”
	caco:canProduce	o6
	caco:hasIndicator	o5-ind1

### 3.8. Indicator o5-ind1

O5-ind1 specifies an indicator for outcome O5. , It specifies its description, and its link to its definition, which we do not show.

Instance	Property	Value
o5-ind1	rdfs:type	caco:Indicator
	sch:name	“Length of Tenure”
	sch:description	“the percentage of the TMs who have lived in Our House accommodation for more than 5 years”
	caco:hasIndicatorDefinition	o5-ind1-def

## 4. Acknowledgements

This work was supported, in part, by Ontario Ministry of Economic Growth and Development and Employment and Social Development Canada.

## 5. References

Fox, M.S., Gajderowicz, B., and Ruff, R., (2019a), “Common Approach Indicator Vocabulary and Repository”, Technical Report, Centre for Social Services Engineering, University of Toronto.

Fox, M.S., Chowdhury, A., Zhang, J., Gajderowicz, B., Abdulai, T., and Rosu, D., (2019b), “CAFO: The Common Approach Foundation Ontology”, Technical Report, Centre for Social Services Engineering, University of Toronto.

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