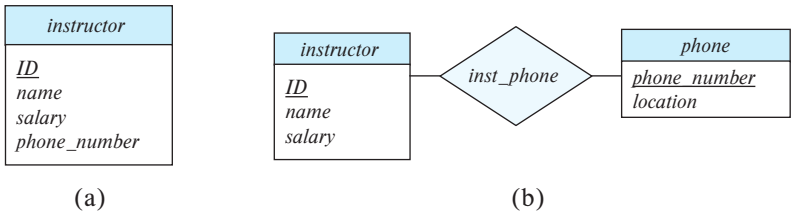

Figure 6.23 Alternatives for adding *phone* to the *instructor* entity set.

_number and *location*; the location may be the office or home where the phone is located, with mobile (cell) phones perhaps represented by the value "mobile." If we take this point of view, we do not add the attribute *phone_number* to the *instructor*. Rather, we create:

- A *phone* entity set with attributes *phone_number* and *location*.
- A relationship set *inst_phone*, denoting the association between instructors and the phones that they have.

This alternative is shown in Figure 6.23b.

What, then, is the main difference between these two definitions of an instructor? Treating a phone as an attribute *phone_number* implies that instructors have precisely one phone number each. Treating a phone as an entity *phone* permits instructors to have several phone numbers (including zero) associated with them. However, we could instead easily define *phone_number* as a multivalued attribute to allow multiple phones per instructor.

The main difference then is that treating a phone as an entity better models a situation where one may want to keep extra information about a phone, such as its location, or its type (mobile, IP phone, or plain old phone), or all who share the phone. Thus, treating phone as an entity is more general than treating it as an attribute and is appropriate when the generality may be useful.

In contrast, it would not be appropriate to treat the attribute *name* (of an instructor) as an entity; it is difficult to argue that *name* is an entity in its own right (in contrast to the phone). Thus, it is appropriate to have *name* as an attribute of the *instructor* entity set.

Two natural questions thus arise: What constitutes an attribute, and what constitutes an entity set? Unfortunately, there are no simple answers. The distinctions mainly depend on the structure of the real-world enterprise being modeled and on the semantics associated with the attribute in question.

6.9.3 Use of Entity Sets versus Relationship Sets

It is not always clear whether an object is best expressed by an entity set or a relationship set. In Figure 6.15, we used the *takes* relationship set to model the situation where a